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POPULAR Computing WEEKLY

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This Week

News Desk

Atari drops injunction attempt against Commodore

by David Kelly

ATARI has withdrawn its application for an injunction against Commodore regarding infringement of its *Pac Man* copyright

The company was applying for an interim injunction to restrain Commodore from sale of the *Jellymonsters* game

Instead, Atari has been granted an order for speedy trial and is pressing ahead with its main action against Commodore

"Atari expects to secure both an injunction and damages for Commodore's infringement of Atari's rights as a result of the full trial which will take place early next year," explained an Atari spokesman

John Baxter for Commodore, commented "Up until Tuesday we thought they were going ahead with the injunction proceedings We were ready to fight it but Atari withdrew its application"

The decision by Atari to drop the temporary injunction attempt appears to have been taken in the light of the company's failure to gain similar injunctions in Hong Kong earlier this year

In October Atari failed to obtain interim injunctions against two Hong Kong companies Video Technology and Soundic Electronics These applications were refused by the judge because they were made on the basis of a "novel point of law"

The purpose of such an interlocutory injunction is to halt offending behaviour pending a full trial Such a trial can take up to two years to come to court The interim injunction is intended as a quickly applicable stop-gap measure which remains in force until the outcome of the trial is decided

However to secure such an order the plaintiff — Atari in these cases — must prove that the "balance of convenience" is on its side

It is also necessary to show that any damages incurred before the trial as a result of refusing the injunction cannot be rectified later

Continued on page 5

Bug Byte's Vic Men – withdrawn earlier this year following action by Atari

Continued on page 29



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The Team

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Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work

This Week

Editorial

The boom in microcomputers over the last 18 months has seen the growth of myriad support industries Software houses, dealer networks and hardware add-on manufacturers have sprung up almost overnight

But, one effect of the micro revolution that has been little remarked outside of the publishing industry, is the phenomenal growth in the number of computer magazines and books Two years ago *Practical Computing* and *Personal Computer World* ruled the roost Now there are more than 30 titles to choose from, not to mention those such as *Personal Computer News* which are to be launched next year

At a time when many publishing companies are struggling to stay alive, computer magazines are proliferating like atoms in a fast-breeder reactor that has gone out of control

The computer press is, by and large, a reflection of the micro world The magazines are young, competitive and enthusiastic

However, the micro market must be close to saturation, if it is not already past it New magazines are going to find it increasingly difficult to establish themselves

Next Thursday

The alien ships have one goal — the destruction of your base Can you survive their continuous attacks? Find out in Suntrap — a new game for the 16K Spectrum by Mike Moscoff

Also next week, a round-up of Dragon's own software John Scriven reviews a range of Dragon cassettes and cartridges and decides whether or not it represents value for money

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Atari drops injunction

continued from page 1

The Judge in refusing the Hong Kong applications has recognised that copyright of computer programs is not a clearly defined area of the law

By withdrawing its interim injunction application against Commodore in the UK Atari has averted the possibility of having the injunction refused

Atari has not climbed down said its spokesman 'Atari has stood over its application to ensure that the court would have the opportunity to decide the issues on a fully developed case '

Another factor in the decision not to continue with the application was undoubtedly that failure would open the way for other companies to recommence sales of *Pac-Man* type programs

Having successfully obtained a 'speedy trial order, Atari can expect a full trial to be heard in the Spring of next year, possibly as soon as February

Atari gets Softcell keyboard

SOFTCELL is now selling a moving keyboard add-on for the Atari 400

Called the B Key 400 it replaces the Atari 400's touch-sensitive keyboard with a full-stroke typewriter-style one

Softcell's Chris Harwood said 'It is a straightforward replacement — function for function No soldering is needed and it only takes a couple of minutes You just pick up the membrane and ribbon, put in our new ribbon and clip on the B Key 400 board "

The unit is available mail-order from Softcell 26 Great Cornbow, Halesowen West Midlands for £79 95

Commodore 64 is on the way

THE first batch of the new Commodore 64 microcomputers should have been dispatched to dealers on November 19

Commodore hopes to sell more than 6,000 of the machines in the UK before Christmas

Epson launches QX10 as rival to Sirius/IBM

EPSON has announced a new desk-top microcomputer less than two months after revealing its first micro the HX20 portable computer

Called the QX10 the new machine will be shown first at the *Which Computer Show* in January and will go on sale at the end of March Costing substantially less than £2 000 it will be a competitor for the Sirius and IBM computers

The processor unit is Z80-based, CP/M compatible, with 192K Ram expandable to 256K It includes twin Epson disc drives with 320K storage per disc Ports include serial, parallel and cassette with five option card slots There is also an optical-fibre interface Cards available will include 16-fount character generator, four serial interface card, colour card, music generator joystick, bar-code a/d and d/a modem and Omninet interfaces The monochrome display output offers a 640 × 400 pixel format Special features of the display include *Pan* and *Zoom* (6 1) commands

The unit will be supplied with a green screen monitor and a keyboard including 14 definable keys

Rivals for the QX10 the Act Sirius 1 (or Victor 9000) and IBM Personal Computer both have a starting price over £2 300

Sinclair's Spectrum delays over

SINCLAIR Research is claiming that delays in Spectrum deliveries are at an end

According to their spokesman, the backlog of orders for its 16K and 48K Spectrum microcomputers was cleared by the first week of November

' We are in a stock situation " he said 'All orders received after the middle of October will be fulfilled within 28 days and by the middle of November we will have supplied well over 60,000 machines "

B Key 400 replacing the touch sensitive keyboard

Sinclair software protection

SINCLAIR Research has sent letters to a number of software houses advising them against 'passing off' their products as Sinclair ones

In a list of guidelines proposed in the letter the company advises that the Sinclair logo is copyright ZX Spectrum is a registered trademark and art work for cassette inserts should not carry the Sinclair name prominently

The move emphasises how important Sinclair considers the software market to be In a recent interview with *Popular Computing Weekly* Nigel Searle head of the company's computer division said The ZX81 is a learning machine The Spectrum is altogether different and the profits to be made on software are high Somebody is going to produce the software for it and it might as well be us

Offending advert

DRAGON DATA has withdrawn one of its advertisements for the Dragon32 micro computer following complaints

The Read this ad to your wife campaign has been attacked as sexist The text includes The Dragon offers 32K Ram Your wife may not understand that so just tell her that the Dragon's capabilities are truly massive

£6 000 Golden Sundial of Pi

Golden gauntlet thrown down

GLITTERING prizes are being offered as a new software concept begins to take hold

Three companies have so far moved into this treasure quest' arena

Pimania is an adventure game for the 48K Spectrum, 16K ZX81, 32K BBC or Dragon 32 microcomputer produced by Automata Ltd In the game where saxophones turn in to hang-gliders and music meets madness', the first to solve the quest and find the Golden Sundial of Pi on their screen will win the original work

The real Golden Sundial of Pi valued at over £6,000 has been specially commissioned from Barbara Tipple winner of the De Beers Diamond International Award Fashioned from gold, lapis lazuli, obsidian and diamond, the piece when aligned, can be used to determine the time

Artic has launched, simultaneously here and in the US, a 16K adventure, *Krakit*, with a £10,000 cash prize to the person who solves the 12 special clues The game is for the ZX81 and TS1000 and went on sale on November 1

Another company, Understanding Ltd is giving £100 to the entrant who obtains the highest score in their *Awari* game when played at the most difficult level — Monster Level *Awari* is for the ZX81 and is based on a West African game in which the idea is to move counters into a particular order in competition with the computer The competition closes on January 10

Proving the pudding

Having had only an elementary education (and that was 65 years ago) I am lost in the world of computers and mathematics My attempts to square the circle on my Spectrum have run into difficulties However, I have managed to "circle the square" — in fact I stumbled on it just playing around Try this

```
10 PLOT 55 85
20 DRAW 125 69 400
```

This draws a large circle using straight lines only very queer as far as I am concerned While the circle is being drawn you cannot use *Break* to stop it why not?

Different numbers in place of the 400 in line 20 give very funny results Try 200000000

I have improved my Spectrum a lot by covering the keys with a piece of cling film I hold it down with one or two bits of Cellotape here and there It gives the keys a harder feel and keeps out bits of food etc (I use my machine through meals, too)

J Livingstone
29 Mayne Avenue
Luton
Bedfordshire LU4 9LR

Office of fair trading

I recently returned my ZX81 to W H Smith for repair the problem being the H J, K and L keys cease to function after about three minutes Upon switching off and restarting they would again function for about three minutes and stop All other keys worked normally

As my ZX81 is still under guarantee I thought everything was all right Not so W H Smith inform me that a charge of £19 47 is required for "damage to keyboard, not covered by guarantee" Apparently the keys have been pressed too hard I should add the computer has been in constant use since it was purchased on December 21, 1981

Also a further handling charge of 33 percent was required by W H Smith because as I quote "we will not be making anything out of it for ourselves" I shall be contacting my local trading standards office and will let you know the results

Alan Jones
24 Old Forge Road
Loudwater
High Wycombe
Buckinghamshire

Ordering procedures

I enjoy *Popular Computing Weekly* greatly but there are one or two suggestions I should like to make, both concerning hardware reviews The first concerns the Rom Could you list all the commands and procedures (e g *If-Then Else Renumber*)

The second is to ask for some benchmarks such as the time to draw 1,000 random hi-res points a *For Next* loop of 10,000 etc

David Little
12 Bistwith Grange
Bistwith
Nr Harrogate
Yorkshire
HG3 3AH

Desirable location

In your September 9 issue you failed to tell Stephen Clements that a form of *Print At* is available on the Vic20

It is placed starting at kernal routine G5520 Although there is no direct Basic command it can be incorporated into a program This is done by loading the *X* and *Y* registers with the required values

The *X* register is held at 781 and *Y* at 782 So by *Poking* the *X* value into the *Y* register and the *Y* value into the *X* register and then calling the machine code by *SYS* G5520 the cursor may be moved to the desired location

David Porter
8 Sunnyside Drive
Clarkston
Glasgow G76 7PU

League table results

I see from your issue Vol 1 No 25 dated October 7 1982 that you found space in which to publish my program *League Table*

However I notice you did not include my correction for line 550 The comparison should have been '> (greater than)' not < (less than The line should have read

```
550 IF TN(5% > TN(5% + 1)
  PROCSWITCH
```

The program has successfully been run since the start of the football season and an addition has been added to print the results of each run of the program as well as the league positions

B H Gagg
1 Evans Close
Brampton
Cambridgeshire PE18 8UH

Tread softly, pilgrim

Having purchased a Commodore adventure game at great expense I am writing to disclose my disappointment I read recently (*Popular Computing Weekly* October 7) of the excitement of working through the stages of an adventure collecting treasures on the way I consider myself to be of at least average intelligence, but for God's sake how does one get out of a quicksand bog carrying inventories at the same time?

There must be something about "Paul's Place" but I'm blowed if I know How do you shift the bloody bear (maybe with honey??) How do you get the damned honey?? What use is the magic word 'Bunyon' when all it does is rip something useful away from you

There must be another route somewhere for I still have four treasures to locate, let alone store I've tried everything and the greatest mystery ever is how one cools down or crosses a lava stream (having been informed that there is something there) And what about the blasted broken sign? There are no words in my Oxford dictionary which begin with "LA' and serve a useful purpose on this adventure

And what are the other two ways of waking the dragon (apart from mud)? Someone please give me some hints — I'm going insane!

Clive Allman
119 Pinner Road
Oxhey
Herts

Some of your problems are related. Without giving away too many secrets, try entering the quicksand with nothing apart from the axe If you get the statue, your "Bunyon" may enable you to swim out of trouble.

I could give you further hints, but it might spoil the game for others Also, I have not progressed that far yet Anyway, the real fun comes in solving the puzzles yourself

Collecting for the future

I will soon by buying a Vic I am already collecting your magazines so that I will have some software to enter when I do get it

I think you have a good variety of Vic programs, but there is hardly ever a Vic adventure game I would be very grateful if you could publish the odd adventure game I think it would make a great magazine even better

James Gillespie
39 Howden Road
London SE25

We do not publish many adventure games for two main reasons First, few adventure games are sent in. Secondly, they take up a lot of space

However, we would be happy to publish a Vic adventure game if other Vic readers also want one Please write in and let us know your views

Decorative function

Here's an interesting — and quite handy — unsuspected function of the ZX Spectrum If you type three quote symbols at each end of a *Print* statement you get a result set in quotation marks without having to bother with the special quote symbol beneath key *A* However, the use of this gimmick is limited because it does not work inside another statement, just on its own

You can also use the quote marks for screen decoration For instance typing *Print* followed by 66 quote symbols will give you a full 32 character line of quotes

Roy Kay
12 Winstanley Road
New Ferry
Wirral
Merseyside L62 1AP

If you have an opinion you want to express or have spotted an error that needs correcting, write to Letters Popular Computing Weekly, *Hobhouse Court, 19 Whitcomb Street London WC2*

Missile Strike

A new game for 16K ZX81
by David Lawrence.

Missile Strike is a game for all those who like to give their alien-zapping activities a little more thought than is needed for the average Invaders look alike

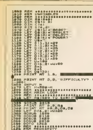
The game puts you in control of six missile bases with a limited stock of missile warheads under attack by an ever increasing number of alien ships Your task is to keep destroying the aliens as long as possible without damaging the regular supply ships which sneak through with fresh supplies of warheads every now and then Alien ships are destroyed by hitting them with a missile *or* by exploding a powerful enough missile near to them, though obviously the further away the explosion the smaller the damage The reason it is so important to keep on destroying the alien ships is that each time one of them lands on the ground it manages to destroy some of your precious stock of warheads — how many depends on how powerful the alien ship is

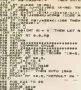
The alien ships when they first appear can have a shield power of anything from 0 to 9 units If they reach the ground the number of warheads you will lose will be equal to their remaining shield power Your missiles on the other hand, can be loaded with multiple warheads to values of 1 2 4, 8, 16 etc units

You have a slight advantage over the alien ships in that a direct hit from one of your missiles will effectively destroy an alien ship of twice the shield power But if the alien ship is precisely twice the power of your missile it will remain on the screen as a powerless hulk which, though it can do you no damage tends to block your shots at other ships If your missile is not so powerful as to actually destroy the ship the explosion will reduce the power of the ships shields by twice the warhead value of the missile

If your missile does not score a direct hit it can still damage an alien ship if it explodes close enough The rule here is that for every unit of distance between your missile and the alien ship the damage caused by the explosion is halved For example a missile with an explosive power of eight can destroy any alien ship on contact and it can destroy any ship with a shield value of up to eight by exploding next to it But with a one square gap between the two it can destroy only a ship of shield-power two







Your control over your missiles is expressed in four commands. Firstly, you can choose the missile base you fire from — there are six in all, spaced along the ground. Secondly you can set a course in a limited way: since missiles can steer roughly between straight up and 20 degrees east. Thirdly, you can set a delay factor ie how far you wish the missile to travel before exploding if there is no direct hit. Lastly you can set the power of the missile. Using these commands you have to try and inflict more damage on the alien fleet than the cost to you in warheads, always hoping that you can survive until the next supply ship lands and disembarks another 100 warheads. Even so they'll get you in the end.

When you *Run* the program you will first of all be faced with a prompt to input the level of difficulty for the game. This figure sets the amount of time you have to make up your mind how to program your missile on each turn. Set it at one and you can sit back and think about everything you do, set it at 200 and you had better not blink.

After inputting your desired difficulty level you will see the ground appear with your six missile bases and a solitary alien ship. At the bottom of the screen will be your score which consists of nothing more complex than the number of turns you have survived, the number of warheads you have and a prompt for the base you wish to fire from.

Depending on the level of difficulty, you now have a limited time in which to input a figure between one and six. If you fail, or if you input an incorrect command, the words "DEFAULT ON BASE?" will appear. In the centre of the screen and the aliens will move down one position without a missile being fired.

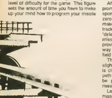
After the base prompt comes the angle prompt with the same time limit. In response you must feed in a figure between zero and nine which will be doubled to make the angle to the east of the missile's track. This is followed by the prompt for 'delay' which is the number of squares the missile will travel before it explodes — provided it does not hit anything on the way. The maximum delay is 18, since the field of play is 18 units high.

The delay input is two digits long, with a slight pause between them. If your missile is clearly going to hit something on the path you have chosen, there is no need to be precise about the delay since the missile will explode on impact anyway.

Lastly you must input the power of your missile. This can be any power of two (including one) up to your total warhead stock. The number input should be one less than the power of two you require ie one provides a missile of power one, two provides two, three provides four, four provides eight, etc.

Your missile will now follow its path to its explosion point and the shield power of the various alien ships is recalculated.

As you blast away, watch out for an asterisk on the screen — it is an unshielded ship that will disappear at the first whiff of an explosion. It is also your supply ship, and if you destroy it by accident you are unlikely to be able to survive until the next one.



Missile Strike program notes

Line(s)

1030 A$ is the array which contains the whole game — all the calculations use this string, while the display is the whole string printed to the screen.

1190 W represents the number of warheads given initially — you can make the game easier by increasing the figure.

1260-1270 The variable H is used simply to set the time allowed to enter commands.

1420 This subroutine assesses the effect of the missile's explosion on adjacent alien ships. Note how the variables M1 and M2 represent the 2 PRINT AT co-ordinates that would be required if the game were actually being stored on the screen rather than in a single long string.

1680 This subroutine accepts the four commands. The loop at 1750 times the default period.

2090 This subroutine calculates the track of the missile up to the point where it either collides with an alien ship or its delay factor runs out.

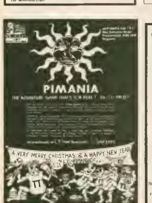
2220 This subroutine generates a random number of aliens on each new line, based upon the number of moves so far.

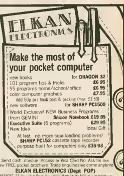
2320-2330 Every ten lines, starting with line 5, a new supply ship is generated.

2350 One of the reasons that a single string is used to store the state of the game, apart from the ease of printing out any changes, is the ease with which the playfield can be manipulated. Line 2370 is all that is needed to move the aliens down a line.

2410 This routine subtracts from the warhead total the value of any alien ship reaching ground level, or adds 100 for any supply ship landing. ■


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Maker of universes

***Brendon Gore** talks to Mike Singleton about Starlord – a computer moderated game*

So you want to rule the galaxy huh? Well you can take it from me that it is not going to be easy

First you must build up your fleet then you have got to locate the Throne Star and finally you will have to defeat the imperial computers running the remains of the old Empyr And just to concentrate your mind another 49 Starlords will be attempting to do exactly the same thing

But if you plan carefully move boldly and don t fall into any traps you could become the next Galactic Emperor

This is not the scenario for another *Star Wars* film or a close encounter of the imaginary kind It is the basis of Starlord a

Mike Singleton Starlord s organiser

computer moderated, play-by mail, game

Starlord is by computer moderated game standards comparatively easy to play Each Starlord game consists of up to 50 players They are entered into a circular galaxy of 1000 stars The Throne Star, needless to say, is at the hub of the galaxy

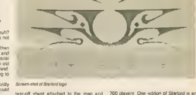
Starting play

Each player starts the game with a base star a command ship and 50 starships The players are also given maps of that portion of the galaxy within range of the command ship's sensors The map contains information about the neighbouring stars and the number of starships within range

No player starts the game within range of another player or the Throne Star

After examining the map each player decides on his strategy for that turn Starships and the command ship are deployed to attack or defend nearby stars

The orders for each turn are written on a

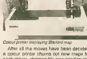


Screen-shot of Starlord logo

tear-off sheet attached to the map and posted to Starlord organiser Mike Singleton The date by which all orders must be posted is printed on the map Each turn takes two weeks to complete

When all the orders are in they are entered into a 32K Pet with 400K dual disc drives The Starlord program then determines the outcome of each move bearing in mind the numerical strength of each fleet and the different attack defend modes chosen Generally a 2 1 advantage gives the attacker a good chance of winning while a 3 1 advantage is usually decisive But as the players learn from experience moves do not always go according to plan

If any player drops out or fails to post his orders in time his command ship stays put and all his mobile starships converge on it



Colour printer displaying Starlord map

After all the moves have been decided a colour printer churns out new maps for each player showing his new position and the outcome of any battles The maps are then dispatched to the players and a new turn begins

The object of the game is to become Emperor of the Galaxy To do this you must find the Throne Star and defeat the present incumbent or the imperial computers if no other Starlord has yet succeeded in becoming Emperor Once Emperor you must try and defend your position against the other Starlords

It costs £1 25 to join Starlord This entitles you to a rule book and two turns in the game Each subsequent turn costs £1 25 The Emperor plays for free

There are 18 different Starlord games in progress at the moment involving about 700 players One edition of Starlord is an international game with players from as far afield as Papua New Guinea Saudi Arabia and Japan There is also an express version where each player has just one week for each move

Starlord is the brainchild of Mike Singleton a 31-year-old Liverpudlian Mike will perhaps be best known by ZX81 owners as author of Sinclair s Games pack No 1

A former English teacher Mike got the idea for Starlord from playing Starweb a US computer moderated play by mail game Starweb is another space war game but you are not provided with a map you have to build up your own

After playing Starweb for two years and winning the game he was in Mike felt that Starweb had certain deficiencies that could be improved The result was Starlord, a program which took Mike three months to write

The first Starlord game started in the Spring of 1981 with just six players In July this year Mike gave up his teaching job to devote himself full time to running Starlord

Next year Mike hopes to start a new

Close up of Starlord map

game provisionally called Atlantis This will be set in medieval times and will include a detailed map of the fabled land

As for me I m still waiting for the post to arrive with the results of my last move Who wants to be Emperor? Well I do for one ■

Starlord is based at 1 Rake Hey Close Moreton Wirral Merseyside

Roll over Beethoven

***Jon Chambers** attempts to trip the light fantastic on the Atari, Vic20 and Dragon 32.*

If the course of history had taken a slightly different path Beethoven might well have had a home computer rather than Haydn or Mozart as music master What would he have thought of these wonders of modern technology? More important perhaps what can computer based music programs do for you the aspiring musician?

Music may not be the most practical application for a domestic computer system — home finance or inventories would probably spring more readily to mind But using computers solely for menial or time saving tasks such as these is to ignore the more positive and interactive aspects of these versatile electronic aids Certainly It is difficult to think of any other type of software package that is more fun, more creative and has greater educational potential than some of the music modules now available on the market

Musical invention in the wider sense, is not a gift that is granted to an exclusive few But it does seem that, for one reason or another, the ability to write music (ie to record musical impulses on paper by way of strict conventional notation) is rather more restricted and rare a skill — and this is where computers can come to the rescue

The Atari Music Composer cartridge (Model CXL 4007) was the first unit to be tested This module forms an attractive and ambitious package and is relatively simple to use once some of the idiosyncrasies have been successfully identified

Firstly, and most curiously I discovered that the computer s voicebox was about a semi tone flat in comparison with the reference standard derived from a conventional tuning fork — the resonance of which can be measured quite scientifically if need be at 440 cycles per second This discrepancy explains the variance between the Atari version of the Fifth and Beethoven s original (see Figs 1 & 2) In effect the computer transposes the music by writing it a semi-tone higher than it sounds (Here Atari s key is that of C sharp minor instead of C minor — or four sharps instead of three flats)

The discrepancy is certainly rather surprising given the sophistication of the cartridge in other respects but should not however, pose too much of a problem After all a gramophone turntable rotating at anything but the precise number of revolutions will also transpose music — equally imperceptibly to most ears And, in any case the module comes equipped with a transpose facility to allow for minor adjustments in either direction

The program s relatively limited span of three octaves will have a debilitating effect upon the more wide ranging musical imaginations The lowest obtainable note is the C below middle C while the highest is 'high C above the treble stave For the majority of purposes this three-octave span will be sufficient Works of such soaring character as Mendelssohn s Violin Concerto will have to wait for an updated six- or seven-octave module to appear before they can be accommodated on Atari staves But you should remember that the program was primarily intended for slightly more modest aims

Lastly the instruction booklet left much to be desired and differences between English and American musical idioms did not help matters I would have felt more at home with the term Voice or Part instead of Phrase for instance as phrase usually means something quite different in a musical context These misgivings apart however the unit performed well and would probably have incurred no more than a passing frown on the great man s brow

Musical Dragon

The British made Dragon 32 was next in the queue With this model the musical component is an integral part of the hardware The *Play* command enables you very quickly and simply to write a string of notes with up to 255 characters per string Elsewhere facilities govern tempo pause and volume (this last function being controlled by an incremental scale between 0 and 31)

On the Dragon the A above middle C was in closer accord with the reference A than was the Atari Unfortunately there is provision here for only one voice which means that harmonic experiments are impossible (and harmonising parts is in my opinion one of the major benefits and

Fig 1 Atari s account of the Fifth – in C sharp minor!

Fig 2 The famous opening bars from the score of the Fifth

The final example uses all the modern technology of the PLAY command on a 4ØØ year old song Would Henry be impressed?

```
1Ø A$ = 'O3L2E L1GL2AL2 BL4O+C#L2O-B
   L1AL2F#L2 DL4EL2F# L1GL2EL2 EL4DL2E
   L1F#V1ØL2DV8L1O-BV6L2O+E L1GL2AL2 B
   L4O+C#L2O-B L1AL2F#L2 DL4EL2F#
   L2 GL4F#L2EV8L2 D#V1ØL4C#V15L2D#
   L1 EL1EP1
2Ø B$ = 'O4L1 DL2 DL4C#O-L2B L1AL2F#L2 D
   L4EL2F# L1GL2EL2 EL4DL2E L1F#L2D
   O-L1BO+L2B O+L1DL2DL2 DL4C#O-L2B
   L1AL2F#L2 DL4EL2F# L2 GV1ØL4F#L2
   EV6L2 D#L4C#V4L2D# V15L1 EL2EP1
30 PLAY  T1ØXA$ XB$ XA$ XB$
```

Fig 3 Henry VIII s Greensleeves in Dragon 32 notation



Fig 4 Atari's Music Composer Instruction booklet.

pleasures to be gained from computerised music) Because the musical element on the Dragon is created by the basic hardware rather than by any software package the level of sophistication is inevitably lower than with the Atari cartridge Notation remains computerish rather than musical (see Fig 3) and it does not have the ability to project musical symbols onto staves for visual display The Dragon is therefore ideal for a computer buff with a secondary interest in music whereas the Atari cartridge is well suited to the serious musician

But as an all-inclusive package the 32 deserves the praise it has received from numerous admirers As David Gunthorpe of Birmingham's Calisto Computers observes, 'the Dragon is the easiest of the computers to write music for

The award for the easiest of the computers to *play* music on however could well go to the Vic20 Two programs were tested for this machine Commodore's own *Type-a-Tune* cassette and the more advanced *Vic Music Composer* marketed by Thorn EMI

The *Type-a-Tune* cassette is an extremely basic unit which will probably have a limited appeal to the more serious musician (or computer buff for that matter)

In fact, an analogy can be drawn between this cassette's capabilities and those of the kind of 'toy keyboards that used to be so common in pre-micro days of old To all intents and purposes the computer keyboard is converted into a musical keyboard in that each individual key directly determines the pitch and duration of the note Thus, the keyboard is used to play music rather than write it The only advantage over a toy instrument educationally speaking is that with the cassette each note is graphically represented on screen so that the user will at least learn to associate sound and symbol

The keyboard extends to a full six octaves, but since it is necessary to change mode each two octaves (via three function keys) this point is a little academic F1 (Function 1) activates the lower end of the musical gamut F3 the mid-range and F5 the upper The F7 key calls up an additional two octave range which is poetically described on the cassette inlay as white noise or to be more prosaic sound effects

Fig 5 Ludwig van Beethoven

Thorn's *Vic Music Composer* on the other hand is just about as sophisticated a program as any currently available in the UK Admittedly in comparison with the Atari it offers a mere trio as opposed to a quartet of voices but it has a greater musical range (encompassing four octaves) an infinitely more accessible instruction booklet which is simplicity itself to read and follow and marginally superior packaging and presentation

Supplier	Program	Machine	Cost	Value (1-10)
Atari UK 185-195 Ealing Road Alperton Wembley Middlesex	*Atari Music Composer*	Atari 400 800	£35 99	7
Commodore 675 Ajax Avenue Slough Trading Estate Slough Berkshire SL1 4BG	*Type-a Tune*	Vic20	£8 69	3
Thorn EMI Upper St Martins Lane London WC2H 9ED	*Vic Music Composer*	Vic20	£16 30	8

Fig 6 Beethoven's autograph

Composition on this model is a relatively simple process Each note is entered by selecting the appropriate note value from a bank of alternatives at the bottom of the screen (ranging from demi semi-quaver to breve) and then launching the chosen value up onto the staves in order to fix its pitch This ingenious method obviates the need to learn the kind of formulae required to operate both the Atari and the Dragon — which, although simple and ingenious enough in their own right do take some while to master

So to return to the questions asked at the beginning it is probably fair to surmise that Beethoven would not have been thrown into ecstasies by the sound quality of the musical offerings under review Nor would he have appreciated limitations regarding pitch dynamic and tonal variation

But several points ought to be made Firstly, these musical devices are very much geared to the requirements of the relative novice not the musical expert The majority of professional musicians, let alone the beginners do not possess perfect pitch and would have difficulty distinguishing a B natural from a B flat — unlike the computer An even more important function carried out by these computers is their ability to play different voices simultaneously

What is more, these machines are essentially educational They are stimulating in that they force the user to work out how to perform certain tasks (ironically this is particularly true of those computers with inadequate or unhelpful booklets), and they undoubtedly foster a deeper interest in, and better understanding of music None of them actually teach you about music, but all can certainly help you to teach yourself

The second important point to bear in mind is that musical micros are still in their infancy and will, like precocious prodigies improve with each passing year In fact it is possible to guarantee that considerable improvements on a number of the machines discussed here will appear on the market within a few months The new Vic64 boasts a significantly better tone quality than the Vic20 so the Thorn Music Composer suddenly looks an even more effective cartridge And looking through Atari's American 'User-Written Program Catalog for Summer 82 I see that a certain Lee Actor won first prize for his *Advanced Music System* which features a 5½ octave span an instantly variable tempo control and an integral synchronisation facility to allow for up to eight voices (with the aid of a cassette recorder)

So the Beethoven of the future might conceivably be prepared to abandon the lacquered elegance of his Steinway for the keyboard of a different box of tricks ■

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published

Sea War

on Spectrum

In Sea-War you are a naval gunner based near the coast. Today is a cold foggy day and visibility is just about zero. Your intelligence men have just handed you a report advising you of an enemy fleet anchored just off the coast. It is your job to try and destroy the enemy fleet in as few shots as possible.

Your intelligence men behind the enemy lines reported the departure of:
1 Submarines (3 squares each (SSS))
2 Destroyers (4 squares each (DDDD))
1 Battleship (5 squares each (BBBBB))

There are, however, conflicting reports of their Aircraft carriers. One group reports that two small Aircraft carriers left the enemy port (4 squares each (AAAA)), and the other group reported the departure of one large Aircraft carrier (8 squares (AAAAAAAA))

To play the game type *Run* and then enter your name and the number of shells that you will require (you will need at least 27 to destroy the ships but you should not require more than 100 shots as there are only 135 spaces to shoot at).

There will then be a short pause while the computer defines some new characters and then the board will be printed. There will again be a short pause while the computer places the ships (they may be horizontal or vertical but will not be diagonal). Then you will be asked to enter the direction of your shot which should be a letter between A and O (if you wish, the range of the shot may be entered at the same time eg B5).

You will then be asked to enter the range as a number between 1 and 9. The computer will then fire a shot and will display a blue ripple for a miss or a red fire followed by the appropriate letter for a hit.

The computer will keep score and will start again when you have finished after first promoting you.

If you wish to give up then enter S when the computer prompts you for the direction of your next shot.

If you run out of shots or if you give up then the computer will display the position of the enemy ships using small letters for the ships or parts of ships that you have hit and using capital letters for the ships that have escaped your shots.

Program notes

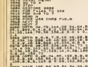
Lines	
1-6	Initialisation
10-80	Draw the board
100-210	Position the Aircraft carrier
300-630	Check that ships do not overlap and then place other ships
1000-1090	Shoot
1100-1160	You missed
2000-2099	You hit
3000-4020	Show where ships were hidden when out of shots or when you give up
5000-5080	Updates the rank of the player
9000-9100	User Defined Graphics

The main variables are:
M$ — Ranks
M — The number of that rank achieved
N$ — Player's name
SCO — Score
SH — Number of shells
S$ — The contents of the sea
D — Direction of ship (up, down, etc)
D$ — Direction of shot
R$ — Range of shot
CHR$ 144-151 — Miss, ripple
CHR$ 152-159 — Hit, fire
F — Various For Next loops

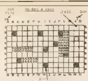
PROGRAM OF THE WEEK

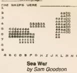
```
This game was written on a 48K
SPECTRUM, but will work on a
16K mode!
   1 DIM M$(6,20): LET M$(1)=" G
UNNER": LET M$(2)=" N. C. O.": L
ET M$(3)=" CAPTAIN": LET M$(4)="
 COMMANDER OF THE FLEET": LET M$
(5)=" ADMIRAL"
   2 LET M=1
   3 INPUT "ENTER YOUR NAME ";N$
   4 INK 0
   5 PRINT "HELLO ";M$(M,2 TO ),
N$
   6 FOR F=1 TO 1500: NEXT F
   7 CLS : LET SCO=0: INPUT "NO.
 OF SHELLS ";SH: INK 0
   8 OVER 1: GO SUB 9000
  10 FOR F=1 TO 9: PRINT AT F*2+
1,0;F;AT F*2+1,31;F: NEXT F
  20 FOR F=8 TO 248 STEP 16
  30 PLOT F,8: DRAW 0,144
  40 NEXT F
  50 FOR F=8 TO 152 STEP 16
  60 PLOT 8,F: DRAW 240,0
  70 NEXT F
  80 FOR F=1 TO 15: PRINT AT 1,F
*2-1;CHR$ (64+F);AT 21,F*2-1;CHR
$ (64+F): NEXT F
 100 DIM S$(9,15)
 110 LET X=INT (RND*15)+1: LET D
=INT (RND*4)
 120 IF (D=0 AND X<15) OR (D=2 A
ND X>1) THEN LET Y=INT (RND*4)+(
5 AND D=0)+(1 AND D=2): GO TO 15
0
 130 IF (D=1 AND X<11) OR (D=3 A
ND X>8) THEN LET Y=INT (RND*8)+(
1 AND D=1)+(2 AND D=3): GO TO 15
0
 140 GO TO 110
 150 LET S$(Y,X)="A"
 160 FOR F=0 TO 3
 170 IF D=0 THEN LET S$(Y-F,X)="
A": LET S$(Y-F-1,X+1)="A"
 180 IF D=1 THEN LET S$(Y,X+F)="
A": LET S$(Y+1,X+F+1)="A"
 190 IF D=2 THEN LET S$(Y+F,X)="
A": LET S$(Y+F+1,X-1)="A"
 200 IF D=3 THEN LET S$(Y,X+F)="
A": LET S$(Y+1,X-F-1)="A"
 210 NEXT F
 300 RESTORE 0
 310 FOR F=1 TO 5
 320 READ A$,A
 330 LET X=INT (RND*15)+1: LET D
=INT (RND*4)
 340 IF D=0 THEN LET Y=INT (RND*
(9-A))+A: GO TO 400
 350 IF (D=1 AND X<(16-A)) OR (D=3
 AND X>A) THEN LET Y=INT (RND*9)
+1: GO TO 400
 360 IF D=2 THEN LET Y=INT (RND*
(9-A))+1: GO TO 400
 370 GO TO 330
 400 FOR C=0 TO A-1
 440 GO TO 600+(D*10)
 450 NEXT C
 500 FOR C=0 TO A-1
 510 IF D=0 THEN LET S$(Y-C,X)=A
$
 520 IF D=1 THEN LET S$(Y,X+C)=A
$
 530 IF D=2 THEN LET S$(Y+C,X)=A
$
 540 IF D=3 THEN LET S$(Y,X-C)=A
$
 550 NEXT C
 555 NEXT F
 560 DATA "S",3,"D",4,"D",4,"B",
5,"S",3
 570 GO TO 1000
 600 IF S$(Y-C,X)<>" " THEN GO T
O 330
 601 GO TO 450
 610 IF S$(Y,X+C)<>" " THEN GO T
O 330
 611 GO TO 450
 620 IF S$(Y+C,X)<>" " THEN GO T
O 330
 621 GO TO 450
 630 IF S$(Y,X-C)<>" " THEN GO T
O 330
 631 GO TO 450
1000 FOR S=1 TO SH
1001 PRINT AT 0,0;: FOR F=1 TO 3
2: OVER 0: PRINT " ";: NEXT F: O
VER 1
1002 POKE 23658,8
1003 PRINT AT 0,0;S-1
1010 INPUT "DIRECTION (A-O) ";D$
1012 IF D$="" THEN GO TO 1000
1013 IF D$(1)="S" THEN GO TO 300
0
1015 IF D$>"O" OR D$<"A" THEN G
O TO 1002
1017 LET V=CODE D$-64
1020 INK 0: PRINT AT 0,V*2;CHR$
 ...
1030 IF LEN D$>1 THEN LET R$=D$(
2): GO TO 1045
1040 INPUT "RANGE (1 TO 9) ";R$
1045 IF R$="" THEN GO TO 1040
1049 IF R$<"1" OR R$>"9" THEN GO
 TO 1040
1050 LET R=CODE R$-48
1060 FOR F=1 TO R*2 STEP 2
1065 BEEP .05,5-(F/2)
1070 INK 0: PRINT AT F,V*2;" "
1075 BEEP .05,8-((F-1)/2)
1080 NEXT F
1090 IF S$(R,V)<>" " THEN GO TO
2000
1100 FOR F=1 TO 10
1105 INK 1
1110 PRINT AT R*2+1,V*2-1;CHR$ 1
44;CHR$ 145
1120 PRINT AT R*2+2,V*2-1;CHR$ 1
46;CHR$ 147
1125 BEEP .05,2-(F/8)
1130 PRINT AT R*2+1,V*2-1;CHR$ 1
48;CHR$ 149
1140 PRINT AT R*2+2,V*2-1;CHR$ 1
50;CHR$ 151
1145 NEXT F
1146 FOR F=1 TO R*2 STEP 2
1149 LET I=ATTR (F+1,V*2)-56: IN
K I
1150 PRINT AT F,V*2;" "
1153 NEXT F
1155 NEXT S
1157 GO TO 3000
1180 STOP
2000 FOR F=1 TO 15
2005 INK 2
2010 PRINT AT R*2+1,V*2-1;CHR$ 1
52;CHR$ 153
2020 PRINT AT R*2+2,V*2-1;CHR$ 1
54;CHR$ 155
2025 BEEP .05,F/5
2030 PRINT AT R*2+1,V*2-1;CHR$ 1
56;CHR$ 157
2040 PRINT AT R*2+1,V*2-1;CHR$ 1
58;CHR$ 159
2050 NEXT F
2055 FOR F=1 TO R*2 STEP 2
2065 LET I=ATTR (F+1,V*2)-56: IN
K I
2075 PRINT AT F,V*2;" "
2085 NEXT F
2086 INK 3
2088 PRINT AT R*2+1,V*2-1;: OVER
 0;S$(R,V);S$(R,V)
2087 PRINT AT R*2+2,V*2-1;: OVER
 0;S$(R,V);S$(R,V)
2088 IF CODE S$(R,V)>90 THEN GO
TO 2099
2090 LET SCO=SCO+1
2091 IF SCO=27 THEN GO TO 5000
2092 LET S$(R,V)=CHR$ (CODE S$(R
,V)+32)
2099 NEXT S
3000 INK 0
3001 OVER 0
3002 PRINT AT 0,0;
3003 FOR F=1 TO 64: PRINT " ";:
NEXT F
3005 IF S>SH THEN PRINT AT 0,0;
"YOU HAVE RUN OUT OF SHELLS"
3010 PRINT "THE SHIPS WERE"
3015 INK 3
3017 FOR F=1 TO 300: NEXT F
3020 FOR F=1 TO 15
3030 FOR G=1 TO 9
3040 PRINT AT G*2+1,F*2-1;S$(G,F
);S$(G,F)
3050 PRINT AT G*2+2,F*2-1;S$(G,F
);S$(G,F)
3060 NEXT G
3070 NEXT F
4000 INPUT "ANOTHER GAME ? (Y OR
 N) ";A$
4010 IF A$<>"N" THEN GO TO 4
4020 STOP
5000 FOR F=1 TO 300: NEXT F
5010 CLS
5015 INK 0
5020 PRINT "WELL DONE YOU HAVE D
ESTROYED THE ENEMY FLEET"
5022 IF M=5 THEN PRINT "I THINK
 THAT THIS IS TO EASY FOR ";"YOU
 AND I SUGGEST THAT YOU TRY WITH
 FEWER SHELLS": GO TO 2
5025 PRINT "AND FOR THIS BRAVE D
EED YOU HAVE BEEN PROMOTED FRO
M ";M$(M);" TO ";
5030 LET M=M+1
```

to next page



```
8870 PRINT M$(N)
8890 GO TO A
8900 STOP
9000 RESTORE 9000
9001 FOR F=144 TO 150
9010 FOR G=0 TO 7
9020 READ A
9030 POKE USR CHR$ F+G,A
9040 NEXT G
9050 NEXT F
9060 DATA 30,79,144,30,64,64,84,
88,4,242,9,4,2,0,2,130,65,64,64,
64,30,144,78,30,130,2,3,2,4,3,24
2,4
9066 DATA 0,0,0,7,0,10,30,90,0,0
,0,224,16,200,40,40,20,20,10,0,7
,0,0,0,40,40,200,16,224,0,0,0
9070 DATA 30,65,130,20,34,73,148
,34,0,30,162,65,5,20,160,73,30,0
0,130,00,34,73,145,34,0,00,180,5
0,0,30,162,73
9079 DATA 0,30,34,65,130,0,0,0,1
62,0,0,30,162,65,6,20,0,40,34,65
,130,0,0,6,120,0,0,30,162,00,6,2
0
9090 DATA 186,00,00,24,24,24,24,
24
9100 RETURN
```





Sea War
by Sam Goodson

3-D

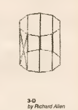
on Spectrum

This program which manipulates a shape defined by the operator in three dimensions is developed round a simple circle drawing routine. If the circle is stepped round in steps of 2PI/N, a polygon of N sides will result. If the vertical axis is reduced than the shape will appear to tilt. If another circle is employed then a solid object can be represented, a prism for example.

The vertical axis is reduced by dividing by *Sin* (tilt) and the distance between the centres of the two ends is calculated by *Cos* (tilt) perpendicular separation.

The controls are the standard cursor controls and the shape can be a prism or a cone, with any height, width, ratio or number of sides. A side can also be marked to facilitate in understanding the complex pattern of lines. *FNa* converts relative drawing to absolute.

```
  1 LET a=I: BORDER 7: PAPER 7:
 INK 0: CLS
  2 PRINT "How many sides?",: I
NPUT sides: PRINT sides: LET pse
ee=sides/2
  3 LET t=1: PRINT "Do you want
 a cone?": INPUT a$: IF a$="y" T
HEN LET t=0
  4 IF t=1 THEN PRINT "Do you w
ant a side marked?": INPUT a$: I
F a$="y" THEN LET a=0
  5 DEF FN a(e)=PEEK (23677+e)
  6 PRINT "How tall do you want
 it?": INPUT t
  7 PRINT "How wide do you want
 it?": INPUT size
 10 GO TO 200
 20 CLS : FOR a=rot TO rot+2*PI
 STEP step
 30 PLOT 128+size*SIN a,88+x+
t*y*COS a
 35 LET a=a+step
 40 DRAW (128+size*SIN a)-FN
a(0),(88+x+y*COS a)-FN a(1)
 50 DRAW (128+size*SIN a)-FN a(
0),(88-x+y*COS a)-FN a(1)
 60 LET a=a-step
 50 DRAW (128+size*SIN a)-FN a(
0),(88-x+y*COS a)-FN a(1)
 65 NEXT a
 55 IF t=0 OR a=1 THEN RETURN
 70 PLOT 128+size*SIN rot,88+x+
y*COS rot
 80 DRAW (128+size*SIN (rot+ste
p))-FN a(0),(88-x+y*COS (rot+ste
p))-FN a(1)
 90 PLOT 128+size*SIN (rot+step
),88+x+y*COS (rot+step)
100 DRAW (128+size*SIN (rot))-F
N a(0),(88-x+y*COS (rot))-FN a(1
)
180 RETURN
200 LET tilt=30: LET rot=0: LET
step=PI/sides
210 LET x=t*COS tilt
220 LET y=size*SIN tilt
230 GO SUB 20
235 IF INKEY$="" THEN GO TO 235
240 LET tilt=tilt+(INKEY$="6")/
5-(INKEY$="7")/5
245 LET rot=rot+(INKEY$="8")/4-
(INKEY$="5")/4
250 GO TO 210
```



3-D
by Richard Allen

Bubbles

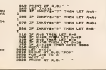
on ZX81

This is a 16K ZX81 program. It creates a moving display of "bubbles" (letter Os) and provides a "pin" (/) with which to burst them. The program can be made to last a longer time by increasing the value of Z at line 350. At the end of the game you are given a score of bubbles burst and a rating. The pin is moved with the cursor keys 5 6 7 and 8.

Program notes

Line	
120 to 150	Gives instructions to start the game
160 to 195	Variables: S = no. of bubbles burst. Z = Counts the trips through the loop and ends game at Z = 120. A & B = position of "pin". C = Sets line for bubbles.
200 to 210	Prints bubbles and scrolls
215 to 360	Moves "pin", checks (with line 218) whether pin has scored a hit, increases Z by 1 and checks value of Z.
2000 to 2050	Subroutine indicating a "hit" on a bubble. Adds 1 to variable S
3000 to 3070	Ends game by giving final score and rating

```
100 REM    BUBBLES
110 REM    EVE GORTON
120 PRINT "HOW MANY BUBBLES CAN
YOU BURST? USE THE CURSOR KEYS
TO CONTROL THE PIN (/)"
130 PRINT "PRESS S TO GO 5W"
140 IF INKEY$<>"S" THEN GOTO 14
0
150 CLS
160 LET S=0
170 LET A=18
180 LET B=18
185 LET C=20
195 LET Z=0
200 PRINT AT C,RND*20,"O"
210 SCROLL
215 PRINT AT A,B,
218 IF PEEK (PEEK 16398+256*PEE
K 16399)=52 THEN GOSUB 2000
220 PRINT AT A,B,"/"
225 FOR J=0 TO 6
230 NEXT J
```



```
240 PRINT AT A,B;" "
245 LET Z=Z+1
250 IF INKEY$="7" THEN LET A=A-
1
260 IF INKEY$="6" THEN LET A=A+
1
270 IF INKEY$="8" THEN LET B=B+
1
290 IF INKEY$="5" THEN LET B=B-
1
310 IF A<0 THEN LET A=0
320 IF A>20 THEN LET A=20
330 IF B<0 THEN LET B=0
340 IF B>30 THEN LET B=30
350 IF Z>=120 THEN GOTO 3000
360 GOTO 200
2000 LET S=S+1
2010 PRINT AT A,B,"POP"
2020 FOR J=0 TO 6
2030 NEXT J
2040 PRINT AT A,B,"   "
```



```
2050 RETURN
3000 CLS
3010 PRINT AT 5,8,"TIME UP"
3020 PRINT AT 10,6,"FINAL SCORE
 ";S
3030 IF S>=20 THEN PRINT AT 18,1
0,"EXCELLENT SCORE"
3040 IF S<=19 AND S>10 THEN PRIN
T AT 18,8,"GOOD SCORE"
3050 IF S<=10 AND S>5 THEN PRINT
 AT 18,6,"NOT SO GOOD"
3060 IF S<=5 THEN PRINT AT 18,8,
"PRETTY USELESS--",,"WHY NOT TRY
AGAIN?"
3070 STOP
```

Bubbles
by Eve Gorton

Pigeon Shoot

on ZX81

This is a game for the 16K ZX81. A clay pigeon appears from the left or the right of the screen at a random height. The 'F' key is pressed to fire at the pigeon and you are told whether your shot has been successful or whether you have missed. A running total of hits is given at the bottom of the screen, along with the gun position, which is fixed. The clay pigeon is represented by a shifted graphics 7 and the empty space. You cannot cheat by keeping your finger on the F key permanently, so don't try!

After 10 pigeons, you are asked whether you want to continue the game or whether you would like to know your final score. The final score is expressed as a percentage rounded down to the nearest whole number.

Line

Program notes

100 to 110	Sets up the variables F (no. of shots), P (no. of pigeons) and S (no. of successful hits)
130 to 160	Gives instructions to start game.
200 to 210	Sets up screen. Indicates no. of hits and gun position
300 to 330	Decides whether pigeon is left or right.
500 to 710	Sends a pigeon across the screen from the left, checks the position of pigeon when F is pressed and sends a successful hit to subroutine 900 and an unsuccessful one to subroutine 1000
800 to 890	As lines 500 to 710, except pigeon emerges from right hand side of screen
900 to 995	**Subroutine for successful hit** 900 to 910 Draws exploding clay pigeon 915 to 920 Pauses loop 930 to 950 Blanks out exploding clay pigeon 960 to 995 Increases value of S, prints "GOOD SHOT", pauses and returns to 200
1000 to 1050	**Subroutine for unsuccessful shot** 1000 to 1030 Prints "MISSED", pauses, blanks the word out 1040 Blanks out the clay pigeon 1050 Returns to 200
8000 to 8010	**Subroutine** for giving choice of continuing game or going to finish. Lines 530 and 830 check the value of P (no. of pigeons). If P is greater than 10 then the program goes to 8000, giving the choice of going on or finishing
9000 to 9050	Calculates and prints final score as a percentage

```
  10 REM   PIGEON SHOOT
  20 REM   EVE GORTON
 100 LET F=0
 105 LET P=0
 110 LET S=0
 130 PRINT TAB 9,"PIGEON SHOOT"
 135 PRINT AT 5,0,"THE CLAY PIGE
ON(▀) APPEARS FROM THE LEFT OR R
IGHT OF THE SCREEN AND MOVES ACR
OSS"
 140 PRINT AT 10,0,"PRESS F TO F
IRE";AT 20,0,"PRESS S TO START T
HE GAME"
 150 IF INKEY$<>"S" THEN GOTO 15
0
 160 CLS
 200 REM START GAME
 210 PRINT AT 21,0,"NO.OF HITS "
;S;AT 19,10;CHR$ 133;AT 20,10;CH
R$ 128;CHR$ 8," GUN"
 300 REM L OR R PIGEON
 310 LET Z=INT (RND*2)
 320 IF Z=0 THEN GOTO 500
 330 IF Z=1 THEN GOTO 800
 500 REM L PIGEON
 510 LET P=P+1
 530 IF P=11 THEN GOTO 8000
 540 LET X=INT (RND*11)+1
 550 FOR Y=0 TO 30
 560 PRINT AT X,Y;" ▀"
 570 IF INKEY$="F" THEN GOTO 690
 680 NEXT Y
 690 LET F=F+1
 700 IF Y=10 THEN GOTO 900
 710 IF Y<>10 THEN GOTO 1000
 800 REM R PIGEON
 810 LET P=P+1
 830 IF P=11 THEN GOTO 8000
 840 LET X=INT (RND*11)+1
 850 FOR Y=31 TO 0 STEP -1
 860 PRINT AT X,Y;"▀ "
 865 IF INKEY$="F" THEN GOTO 880
 870 NEXT Y
 880 LET F=F+1
 885 PRINT AT X,0;" "
 888 IF Y=10 THEN GOTO 900
 890 IF Y<>10 THEN GOTO 1000
 900 PRINT AT X-1,10;CHR$ 134;CH
R$ 6
 905 PRINT AT X,10;CHR$ 27;CHR$
27
 910 PRINT AT X+1,10;CHR$ 27;CHR
$ 134
 915 FOR J=0 TO 10
 920 NEXT J
 930 PRINT AT X-1,10;CHR$ 0;CHR$
0
 940 PRINT AT X,10;CHR$ 0;CHR$ 0
 950 PRINT AT X+1,10;CHR$ 0;CHR$
0
 960 LET S=S+1
 970 PRINT AT 13,15;"GOOD SHOT"
 980 FOR J=0 TO 10
 985 NEXT J
 990 PRINT AT 13,15;"         "
 995 GOTO 200
1000 PRINT AT 13,10;"MISSED"
1010 FOR J=0 TO 10
1020 NEXT J
1030 PRINT AT 13,10;"      "
1040 PRINT AT X,Y;" "
1050 GOTO 200
8000 CLS
8010 LET P=0
8020 PRINT AT 10,0;"IF YOU WANT
TO CONTINUE PRESS C";AT 12,3;"IF
 YOU WANT TO DISCOVER YOUR FINAL
 SCORE  PRESS E"
8030 IF INKEY$="C" THEN GOTO 850
0
8040 IF INKEY$="E" THEN GOTO 900
0
8050 IF INKEY$<>"C" AND INKEY$<>
"E" THEN GOTO 8030
8500 CLS
8510 GOTO 200
9000 CLS
9010 PRINT AT 5,0;"NO. OF SHOTS
";F
9020 PRINT AT 7,0;"NO. OF HITS
";S
9030 LET T=INT ((S*100)/F)
9040 PRINT AT 15,0;"PERCENTAGE O
F HITS ";T
9050 STOP
```

Pigeon Shoot
by Eve Gorton

Addrsssss

on Vic20

Addresses is a fairly simple program used to retrieve names, addresses and telephone numbers stored in a single array. The array allows one line for name, three lines for address and one line for telephone number.

The ideal storage medium is, of course, a disk drive, but owing to the cost, most home users do not have one. Tape storage is, of course, common and cheap, but has the drawbacks of slow speed and only sequential access, so I decided to store data within the program using *Data* statements and retrieve it by *Read* statements.

This means that new information that is required has to be written into the program, and the updated version resaved each time. The format of the *Data* statement is important to keep the information in line. The array A$ eventually stores the information and the second parameter dictates how many name and address fields each *Data* statement must contain. This can be changed if required. Further enhancements could be made to enable any type of information to be stored and retrieved.

Program notes

Lines	
5	Sets print to black, screen and border to red, volume to 15
10	Dimensions array to store data.
30 to 40	Loop to read information into array. Terminates on upper limit or by ready "DUMMY" Z
45	Clears screen
50	Asks for input of surname or "XXX" terminates the program. Note: If two or more surnames are the same, a further qualifier is required, ie SMITHJ, SMITHT
60	Reads input.
70 to 90	Searches main array for name comparison
100	Check for name not found
110 to 125	If name found, outputs details to screen
130	Audio bleep. Requests space bar to continue
140	Tests for keyboard input.
150	Returns to top of processing
300 to 8998	DATA statements. Example shown of using commas to signify blank lines
8999	Dummy record
9000	End

```
00005 PRINT"(BLK)" POKE36879 42 POKE36878 15
00010 DIMA$(100 5)
00020 FORX=1TO100
00030 FORY=1TO5 READB$ IFB$="Z"THEN45
00040 A$(X Y)=B$ NEXTY X
00045 PRINT"(CLR)"
00050 PRINT"ENTER SURNAME YOU" PRINT"REQUIRE"
      PRINT" OR XXX TO FINISH"
00060 INPUTB$ IFB$="XXX"THEN9000
00070 FORI=1TO100
00080 IFA$(I 1)=B$THEN100
00090 NEXTI
00100 IFI=101THENPRINT"●●     (RVS ON)NAME NOT
      FOUND(RVS OFF)" GOTO130
00110 PRINT"(CLR)●●●●●●"
00120 PRINTA$(I 1) PRINT PRINTA$(I 2) PRINT PRINT
      A$(I 3) PRINT
00125 PRINTA$(I 4) PRINT PRINTA$(I 5) PRINT
00130 POKE36876 200 FORT=1TO20 NEXT POKE36876 0
      PRINT"       PRESS SPACE BAR"
00140 GETZ$ IFZ$=""THEN140
00150 GOTO45
00300 DATASMITHJ 52 NEW ROAD DARLINGTON
      DARLINGTON 034641
00301 DATAJONES 144 HIGH STREET DERBY
      DERBY 72245
00302 DATASMITHT 65 BRIDGE STREET STOKE ON TRENT
      STAFFS STOKE 554980
00303 DATAWORTHINGTON 176 CORPORATION STREET
      STRATFORD WARKS
08999 DATAZ
09000 POKE36879 27 PRINT"(CLR)" END
```

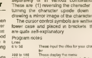
Addresses
by Kevin Gray

Character Manipulator

on Vic20

My inspiration for this program came when I needed a mirror image of a character. Thus I wrote a short sub-routine to do this and I suddenly realised what a good program it could make. Then I wrote a series of other sub-routines finally putting them together to make this program.

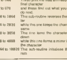
The program performs three functions


separately or in various combinations. These are (1) reversing the character (2) turning the character upside down (3) drawing a mirror image of the character.

The cursor control symbols are written in lower case and placed in brackets: they are quite self-explanatory.

Program notes

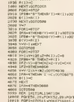
Lines	
6 to 50	These input the data for your character
100 to 190	These display the menu
200 to 290	and these find out and Goto the correct sub-routines



500 to 600	These print the data and results of the final character
590 to 670	and these find out what you want to do next.
1000 to 1060	This sub-routine reverses the character
2000 to 2030	while this one keeps the character the same
3000 to 3050	This one turns the character upside down
4000 to 4080	while this one forms a mirror image of the character
10000 to 10020	This sub-routine initialises the program



```
5 GOSUB10000
6 PRINT"(clr)PLEASE INPUT THE DATA FOR YOUR CHARACTER"
10 FORI=0TO7
20 INPUTA
30 IFA>255ORA<0THENPRINT"INPUT INCORRECT":GOTO20
40 A(I)=A
50 NEXT
100 REM MENU
110 PRINT"(clr)PLEASE CHOOSE FROM THE         MENU
120 PRINT:PRINT"TYPE MODE"
130 PRINT"  -  NORMAL"
140 PRINT"  -  REVERSED"
150 PRINT:PRINT"TYPE OF CHARACTER"
160 PRINT"  -  NORMAL
170 PRINT"  -  UPSIDE DOWN"
180 PRINT"  -  MIRROR IMAGE"
190 PRINT"  -  HALF TURN(BOTH OF     THE ABOVE TOGETHER)"
200 REM CHOOSE AND GOTO CORRECT SUB-ROUTINE
210 INPUT A$
220 B$=LEFT$(A$,1)
230 A=VAL(RIGHT$(A$,1))
240 IFB$="B"THENGOTO1000
250 IFB$<>"A"THEN100
260 IFA=1THEN2000
270 IFA=2THEN3000
280 IFA<5THEN4000
290 GOTO100
500 PRINT"(clr)FROM-        TO-";
510 FORI=0TO7
520 PRINTTAB(5)A(I)TAB(15)B(I)
530 NEXT
540 POKE36869,255
550 X=7168
560 FORI=0TO7:POKEX,A(I):X=X+1:NEXT
570 FORI=0TO7:POKEX,B(I):X=X+1:NEXT
580 PRINT:PRINTTAB(5)"@"TAB(15)"A"
590 PRINT:PRINT"PLEASE HIT A KEY"
600 PRINT"1 - REDEFINE
610 PRINT"2 - RETURN TO MENU"
620 PRINT"3 - QUIT"
630 GETC$:IFC$=""THEN630
635 IFVAL(C$)>0ANDVAL(C$)<4THENPOKE36869,240
```



```
640 IFC$="1"THENRUN6
650 IFC$="2"THEN100
660 IFC$="3"THENEND
670 C$="":GOTO630
1000 FORI=0TO7
1010 X=A(I):Y=128:C=255
1020 IFX-Y>=0THENX=X-Y:C=C-Y
1030 IFX=0THEN1050
1040 Y=Y/2:GOTO1020
1050 A(I)=C
1060 NEXT:GOTO260
2000 FORI=0TO7
2010 IFB$="B"THENB(I)=A(I):GOTO2030
2020 B(I)=A(I)
2030 NEXT:GOTO500
3000 Y=7
3010 FORI=0TO7
3020 IFA=4THENB(Y)=A(I):GOTO3040
3025 IFB$="B"THENB(Y)=A(I):GOTO3040
3030 B(Y)=A(I)
3040 Y=Y-1:NEXT
3050 GOTO500
4000 FORI=0TO7
4010 X=1:Y=128:Z=A(I):C=0
4020 IFB$="B"THENZ=A(I)
4030 IFZ-Y>=0THENZ=Z-Y:C=C+X
4040 IFZ=0THEN4060
4050 Y=Y/2:X=X*2:GOTO4030
4060 IFA=4THENA(I)=C:GOTO4075
4070 B(I)=C
4075 NEXT
4076 IFA=4THEN3000
4080 GOTO500
9999 REM INITIALISATION
10000 POKE56,28:POKE52,28:POKE51,0
10010 FORI=0TO511:POKE7168+I,PEEK(32768+I):NEXT
10020 RETURN
```


Character Manipulator
by Simon Evans

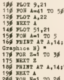
Saturn

on ZX81

Here is a great program for a ZX81. I bought your magazine not too long ago and in it was a program for a BBC computer. I tried the program and was so impressed I wrote it for a ZX81.

I call the program ZX Saturn because it draws Saturn with its rings using *Plot* and then draws a space ship landing.

```
1Ø FOR A=1 TO 65
2Ø PLOT 3Ø+SIN (A*Ø.1)*1Ø,2Ø+COS
(A*Ø.1)*1Ø
3Ø NEXT A
4Ø FOR A=1Ø TO 5Ø
5Ø PLOT A,2Ø
6Ø NEXT A
7Ø FOR A=1Ø TO 19
8Ø PLOT A,22
9Ø NEXT A
```



```
1ØØ PLOT 9,21
11Ø FOR A=41 TO 5Ø
12Ø PLOT A,22
13Ø NEXT A
14Ø PLOT 51,21
15Ø FOR A=1 TO 5
16Ø PRINT AT A,14;" (Graphics E,
Graphics R) "
17Ø FOR Z=1 TO 3Ø
175 NEXT Z
18Ø PRINT AT A,14;" (Two spaces) "
19Ø NEXT A
2ØØ FOR N=1 TO 2Ø
21Ø PRINT AT A,14;" (Two graphic spaces)
";AT A,14;" (Two spaces) "
22Ø NEXT N
23Ø PRINT AT A,14;" (Two graphic 6's) "
```

Saturn
by Richard Aston

Polygon-drawing

on BBC Micro

This is a very simple procedure for drawing an N-sided polygon anywhere on the screen (N can vary from 3 upwards, although above about 18 the polygon just looks like a circle.) It is based on the equation for a circle. The X- and Y co-ordinates being set to the required number of points along that circle, e.g. N = 3 will give a triangle.

You define five variables in the procedure — call — "X" and "Y" are the X- and Y-co-ordinates respectively of the centre of the polygon. "R" is the radius of the circle within which the polygon is drawn or in other words, the distance from the centre to one corner. "C" is the colour you wish the polygon to be. "N" is the number of sides.

Line 510 simply sets the graphics colour. Line 520 moves the graphics cursor to the centre of the polygon. Lines 530-560 plot and fill in a series of triangles thus producing the polygon. Line 570 is required to fill in the last triangle and complete the polygon.

Two simple programs which use this procedure are shown below. The first simply draws different polygons in different colours and decreasing size in the centre of the screen.

The second draws circles in concentric circles. Each concentric circle being a different colour. (Again this program is based on the equation for a circle.)

The program will work on a Model A BBC Micro. Obviously Model B owners will be able to produce more spectacular effects.

1 Concentric Polygons

```
10 MODE5
20 CO - 0
30 RA - 400
40 FOR N   20 TO 3 STEP  1
50 CO - CO + 1
60 PROCdraw (600 550 RA CO N)
70 RA   RA  20
80 NEXT
90 END
```

2 Concentric Circles

```
10 MODE5
20 CO   0
30 FOR RA   600 TO 50 STEP -50
40 CO   CO + 1
50 FOR Z   0 TO 2 * PI STEP 90
60 X - RA * COS(Z) + 600
70 Y - RA * SIN(Z) + 600
80 PROCdraw(X Y 80 CO 10)
90 NEXT NEXT
100 END
```

Procedure to draw polygons

```
500 DEF PROCdraw(x y r c n)
510 GCOL0 c
520 MOVEx y
530 FOR T - 0 TO 2 * PI STEP 2 * PI/n
540 MOVEx y
550 PLOT r * COS(T) + x r * SIN(T) + y
560 NEXT
570 PLOT85 r * COS(0) + x,r * SIN(0) + y
580 ENDPROC
```

Polygon-drawing
by Daniel Grantar

Mortgage

on BBC Micro

This program will produce a quote for the monthly mortgage repayments for an amount borrowed at any given interest rate. A range of quotes can be obtained by specifying the maximum and minimum years of a period. The program is written for easy transportation to other micros.

The program runs on a BBC model B computer but by changing line 10 to *Mode4* it will also run on a model A in a two-colour mode, four colours only being used to improve the presentation. The VDU and colour statements could be omitted for running on other machines.

Program notes

Lines	
30	Select logical to physical colour relationship
100 to 150	Input your data.
260 to 290	Provides the calculation
600	Defines Fna(X) to round the calculations to two decimal places
410 to 500	Sub-routine used to format the print output to give two columns of zeros after the pounds should there be no pence to print. The sub routine is used in preference to the BBC print format instruction to make it easier to run the program on other machines.

```
10 MODE1
20 CLS
30 VDU 19,3,3,0,0,0,19,2,2,0,0,0
40 COLOUR 129
50 PRINTTAB(0,1)'                        "
60 PRINT TAB(8,2)'  MORTGAGE REPAYMENTS  "
70 PRINT TAB(8,3)" -------------------- "
80 COLOUR 128
90 PRINT:PRINT
100 INPUT  "INTEREST RATE............",TAB(25) I
110 PRINT
120 INPUT 'SUM BORROWED.............',TAB(25) S
130 PRINT
140 INPUT  HOW MANY YEARS MAX.......",TAB(25) A
150 PRINT
160 INPUT'HOW MANY YEARS MIN....... ,TAB(25)B
170 PRINT PRINT
180 Z=FNA(S)
190 GOSUB 410
200 COLOUR 131:COLOUR 0
210 PRINT FOR LOAN OF ,TAB(30-LEN(Z$)) '';Z$
220 COLOUR 129 COLOUR 3
230 LET I=I/100
240 FOR Y=B TO A STEP 2
250 LET X=(1+I)^Y
260 LET P1=X*I*S
270 LET P2=(X-1 *12
280 LET A=P1/P2
290 Z=FNA(A)
300 GOSUB 410
310 PRINT
320 PRINT"PAYMENT/MONTH OF",TAB(25-LEN(Z$)) ' ,Z$;
      FOR  ,Y YRS'
330 NEXT Y
340 COLOUR 2
350 PRINT  "DO YOU REQURE ANOTHER QUOTE
360 COLOUR3
370 IF GET$= Y" THEN 20
380 PRINT:PRINT PRINTTAB(4)"*** BYE FOR NOW ***"
390 END
400 DEF FNA(X)=INT(X*100+.5)/100
410 Z$=STR$(Z)
420 L=LEN(Z$)-2
430 IF L=0 THEN 470
440 IF MID$ Z$ L,1)= . THEN 500
450 L=L+1
460 IF MID$(Z$ L,1)='. THEN 490
470 Z$=Z$+ .00
480 GOTO 500
490 Z$=Z$+ 0
500 RETURN
```

Mortgage
by Barry Wells

Cube Drawer

on BBC Micro

Most microcomputer owners especially those with *Hires* micro s would like to draw two dimensional objects but be cause it is commonly supposed to involve complicated maths they do not I hope my program demonstrates how easy 3-D graphics are!

Although it is intended that *Procicd* is used in your own programs it can be used as a program in itself The corners of the cube are

(O S)
(S S)
(S/2 S S 2)
(S 2 S 2)
(O O)
(S O)
(– S/2 – S 2)
(S/2 S 2)

where S is the side length and (O O) is the origin of the cube

Program 2 with the *Proc* supplied in the A version will draw a solid cube in a randomly selected colour but if the *Proc* in lines 110 to 220 is substituted with a *Proc* 'B version then a framework cube will be drawn

Rem statements can be left out and are not targets of *Goto* s etc If you are using a colour tv then type in line 70 otherwise omit it because colour differences will not be noticeable Line 70 should be omitted if *Proc* B is used

If you do not wish to keep typing in the values for side length etc then turn line 120 into a *Rem* and take out the *Rem* in line 130

For those of you considering conver sion details are supplied below

Vdu 28 defines a text window for the Input statement

VDU 19 selects the palette of colours available

Vdu 29 defines the graphics origin i e where the lower corner of the cube is positioned

Plot 4 X Y is equivalent to *Move* and *Plot* 5 X Y equals *Draw* the colour is selected by C and the *Gcol* (graphics colour) statement outlines the sides of the cube (line 200)

Proc B (can be substituted for Proc A)

```
L.
  110DEFPROCICE
  120INPUT"X,Y ,SIDE"X,Y,S:IF X=0 AND Y=0 THEN X=580:Y=500
  130VDU29,X;Y;:S=S*10
  140PLOT4,0,0
  150PLOT5,S,0:PLOT5,S,S:PLOT5,0,S:PLOT5,0,0
  160PLOT5,-S/2,-S/2:PLOT5,-S/2,S-S/2:PLOT5,S-S/2,S-S/2:PLOT5,S-S/2,
-S/2:PLOT5,-S/2,-S/2
  170PLOT4,S-S/2,S-S/2:PLOT5,S-S/2,-S/2
  180PLOT4,S-S/2,S-S/2:PLOT5,S,S
  190PLOT4,-S/2,S-S/2:PLOT5,0,S
  200PLOT4,S-S/2,-S/2:PLOT5,S,0
  210ENDPROC
  220REM *** WIRE CUBE DRAWER ***
>
```

Using Proc A in lines 110 to 220

```
>L.
   10 REM **** CUBE DRAWER ****
   20 REM **** C.BOWERMAN ****
   30 MODE7:FORI=0TO1:PRINTTAB(4,I)CHR$141"C U B E  D R A W E R":NEXT
   40PRINTTAB(5);"DRAWS AND FILLS CUBES";TAB(5)"OF SIDE S AT X,Y";TAB(5)
"HIT SPACE TO CONTINUE"
   50 A$=GET$:IF A$<>" " GOTO50
   60MODE5:VDU28,0,1,19,0
   70REM FOR COLOUR MONITORS ONLY:-VDU19,2,4,0,0,0,19,3,2,0,0,0
   80PROCICE
   90GOTO80
  100END
  110DEFPROCICE
  120INPUT"SIDE LENGTH S (X,Y)"S,X,Y:S=S*10:VDU29,X;Y;:C=RND(3):GCOL0,C
  130REMS=RND(25)+10:X=RND(1000):Y=RND(1000):VDU29,X;Y;:C=RND(3):GCOL0,C
  140PLOT4,0,S:PLOT5,0,0:PLOT85,S/2,S/2
  150PLOT5,-S/2,S-S/2:PLOT85,0,0
  160PLOT5,S,0:PLOT5,S,S:PLOT85,S/2,S/2
  170PLOT5,S/2,-S/2:PLOT85,S,0
  180PLOT5,-S/2,S-S/2:PLOT5,S/2,S/2:PLOT85,-S/2,-S/2
  190PLOT5,S/2,-S/2:PLOT85,S/2,S/2
  200GCOL4,1:MOVE-S/2,S-S/2:DRAWS/2,S/2:DRAW0,S:MOVES/2,S/2:DRAWS/2,-S/2
  210GCOL1,C
  220ENDPROC
>
```

Cube Drawer
by Carol Bowarman

Practised entering

Colin McCormick presents a machine code monitor for the Vic20.

It was never exactly easy to enter machine code into a Vic20 without an assembler but now it is possible. This program allows hex to be entered, edited, listed, deleted and inserted. It also allows any part of memory to be saved on tape and read back, as well as giving dec/hex conversion and editing — with locations in both forms. You could not ask for a more powerful machine code monitor, yet it is easy to use.

RUN

Enter what location you want to run from. If you hit *Return*, it will run from the first location (6500).

↑ EDIT DEC

When you have listed any location, you can change its value by just entering hex. Alternatively press ↑ and you can enter decimal.

N NEW

Clears all free Ram. Do this when you first enter the monitor and when you want to clear a machine code program.

£ LIST FROM

Press this and enter the location you wish to see (in decimal). This will be listed, and subsequent depressions of the space bar will show the next locations.

R READ

Enters a machine code program from tape in the same location as it was written. When ready it will show the first location.

SPC LIST

Press the space bar to display the next location.

K COPY

To save a program on tape press K then enter the first and last locations of your program.

I INSERT

Inserts spaces. Enter what location you want the insertions to start at, the end of your program (hitting *Return* will move all of the Ram up, and so waste time) and the amount of spaces. Then wait.

F1 MENU

Shows titles again.

DELETE

As with insertion but memory moves in opposite direction.

F3 BASIC

Returns to Basic.

F5 dec/hex

Allows any decimal number to be displayed in hex.

A brief outline of the listing is given.

0 Protects memory from Basic.
J = First available location.
K = last. Reduces keyboard buffer size which can be a nuisance.
L = Location program is at.

10-20	Takes in instructions.
100-104	Takes in second part of hex and pokes it in.
200-840	Reads from tape.
1000-1024	Run.
1400	No need to enter this!
2000-2015	Decimal edit.
2050	List from.
2100-2140	List routine.
3000	Sound routine.
3500-3511	Tape copy.
5000-5005	dec → hex conversion.
5000-5040	dec → hex subroutine.
7000-7505	Delete.
8000	hex → dec.
9000-9001	dec error detection.

To use the program a list of hex opcodes is required and a bit of practice. You can just get by with the Vic Programmers' Reference Guide. It may not be as good as *Vicmon* but then it does not cost £35! If you are familiar with the monitor fitted to some Pet machines, you will see how useful this one is. ■

```
0 POKE55,0:POKE56,25:CLR:J=6500:K=7679:L=J:POKE649,1:V=36875
3 PRINT" RUN    ↑ EDIT DEC":PRINT"N NEW    £ LIST FROM"
4 PRINT"R READ    SPC LIST":PRINT"K COPY    I INSERT":PRINT"F1 MENU
DELETE
5 PRINT"F3 BASIC F5 DEC HEX":PRINT:PRINT"HEX=DEC  LOC= HEX"
10 GETA$:IFA$=""THEN10
11 H=ASC(A$):IFH=20THEN2100
12 IFH=42THEN1000
13 IFH=94THEN2000
14 IFH=92THEN2050
15 IFH=78THEN2000
16 IFH=82THEN800
17 IFH=133THENRUN
18 IFH=78THENPOKEV,200:POKEV+1,0:FORB=J TOK:POKEB,0:NEXT:POKEV+3,0:RUN
19 IFH=75THENH=J:INPUT"COPY FROM";H:GOTO3000
20 IFH=45THEN7500
21 IFH=134THEN3000
30 IFH=136THEN8000
25 U=200:GOSUB3000:H=ASC(A$):GOSUB8000:PRINTA$;
100 GETB$:IFB$=""THEN100
104 PRINTB$:H=ASC(B$):GOSUB8000:A=A+B:POKEL,A:GOSUB5000
130 PRINTTAB(2);F;TAB(9);L;:B=L:GOSUB5000:PRINT(2);PEEK(L):L=L+1:U=200:
GOSUB3000:GOTO10
800 PRINT"SEARCHING":OPEN1,1,0:PRINT"LOADING"
805 INPUT#1,L,A:POKEL,A:L=L+1
810 INPUT#1,L,A:POKEL,A
820 IFST=0THEN810
830 CLOSE1:L=H:GOTO2110
1000 H=J:INPUT"RUN FROM";H:PRINT" RUN M/C":SYSH
1021 WAIT198,1:END
1400 REM A.M.T.H.U.R. TO ADAPT AS 800 AS CITIZEN PRINT
2000 INPUT"TO DEC ";A:IFA<0ORA>255THEN2000
2010 POKEL,A:U=230:GOSUB3000
2015 B=PEEK(L):GOSUB5000:PRINT:L=L-1:GOTO2110
2020 GOTO10
2050 INPUT"LOC ";L:B=PEEK(L):GOSUB5000:U=230:GOSUB3000
2060 L=L-1:GOTO2110
2100 L=J-1
2110 POKEV+3,15:POKEV,220:L=L+1:B=PEEK(L):GOSUB5000:U=J$:B=L:GOSUB5000:B$=J$
2112 PRINTU$;TAB(2);PEEK(L);TAB(8);L;56
2115 POKEV+3,0:POKEV+2,0:IFB=1THENB=0:GOTO2110
2120 GETJ$:IFJ$=""THEN2120
2130 IFJ$=" "THEN2110
2140 A$=J$:GOSUB3000:GOTO11
3000 POKEV+3,15:POKEV,U:FORM=1TO80:NEXT:POKEV+3,0:RETURN
3500 INPUT"LAST LOC";R:PRINT"COPYING":OPEN1,1,1,"M/C PROGRAM FILE"
3510 FORL=HTOR:P=PEEK(L):PRINT#1,L:PRINT#1,P:NEXT:PRINT"FINISHING COPY":CLOSE1
3511 PRINT"FINISHED":GOTO10
4000 INPUT"DEC ";B:POKE36876,25:POKE36876,222:GOSUB5000:PRINTTAB(9)"(DEC)=";J$;
"(HEX)"
4005 POKE36876,0:POKE36876,0:GOTO10
5000 H1=INT(B/4096):B2=B-H1*4096:H2=INT(B2/256):B2=B2-H2*256:
H3=INT(B2/16)
5010 H4=B2-H3*16:H6=H2:J$=CHR$(H1+48-(H1>9)*7):J$=J$+CHR$
(H2+48-(H2>9)*7)
5020 J$=J$+CHR$(H3+48-(H3>9)*7):J$=J$+CHR$(H4+48-(H4>9)*7)
5030 IFLEFT$(J$,1)="0"ANDLEN(J$)>2THENJ$=RIGHT$(J$,LEN(J$)-1):GOTO5030
5040 RETURN
7000 INPUT"START LOC";P:K=K:INPUT"LAST LOC";T:INPUT"HOW MANY
INSERTIONS";D:FORH=TTO
7010 POKEV+3,7:POKEV,221:FORH=0-1TOPSTEP-1
7020 X=PEEK(H):POKE(H+D),X:NEXT
7030 POKE(H),0:L=P-1:POKEV+3,0:NEXT:POKEV,0:GOTO2110
7500 G=K:INPUT"START LOC";P:INPUT"LAST LOC";G
7505 INPUT"HOW MANY DELETIONS";D:POKEV,200:POKEV+3,7:FORH=PTOG:
FORH=P+1TOG
7510 X=PEEK(H):POKE(H-1),X:NEXT:NEXT:POKE0,0:L=P-1:POKEV,0:POKEV+3,
0:GOTO2110
8000 F=(ASC(MID$(A$,1,1))-48-(ASC(MID$(A$,1,1))>57)*7)*
(16↑(2-H)):NEXT:RETURN
9000 IFH<48ORH>70ORH>57ANDH<57THENPRINT "ERROR":U=140:GOSUB3000
:GOTO10
9001 RETURN

READY

READY

READY

0 POKE55,0:POKE56,25:CLR:J=6500:K=7679:L=J:POKE649,1:V=36875
```

Functional Subroutines

In part two of our extract from The Working Spectrum we continue adding modules/subroutines to the Unifile program designed to enable a single program to cover a variety of filing tasks without the need for constant re-writing every time a new use comes along

Module 2

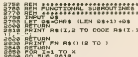
This simple module contains a number of very brief routines which are more economically placed into a subroutine than written out in full every time they are needed Note the similarity here to the use of a user defined function which serves a similar space-saving function

If a function is always to work on the same variables then a one line subroutine can be just as effective Defined functions come into their own when the same function is made to work upon different variables in different places

Line 2790 could for instance be replaced by a defined function such as DEF FN Q$()=CHR$(LEN Q$+1)+Q$ To call up this function, however, would always take two lines INPUT Q$ and LET Q$=FN Q$() so there would be no real saving compared to the single line necessary to call up the brief subroutine at 2780 If there were three or four different strings on which we wanted to perform this function we could have defined it as DEF FN Q$(Q$)=CHR$(LEN Q$+1)+Q$

The function can now be applied to other strings simply by putting the required string into the brackets when the function is called up, e g LET C$=FN Q$(C$) If we wanted to work on C$ with a one line subroutine, then we would need an extra subroutine to deal with C$

The moral of all this is simply that defining functions just for the sake of it can be a waste of time Save valuable defined functions for operations which can be applied to different variables in different places



Unifile: *Module 2*

```
2750 REM *************************
2760 REM FUNCTIONAL SUBROUTINES
2770 REM *************************
2780 INPUT Q$
2790 LET Q$=CHR$ (LEN Q$+1)+Q$
2800 RETURN
2810 PRINT A$(I,2 TO CODE A$(I,1
)),"  ";
2820 RETURN
2830 PRINT FN A$()(2 TO )
2840 RETURN
2850 FOR I=1 TO X
2860 GO SUB 2810
2870 GO SUB 2830
2880 LET C=C+CODE B$(C)
2890 NEXT I
2900 RETURN
```

Commentary

The module is made up of four subroutines as follows 1) Lines 2780-2800 This section adds to the input Q$ the indicator that was mentioned in the introduction The indicator takes the form of a single character Remember that each character on the Spectrum has a unique *Code* value, a list of these values can be found in Appendix A of the Spectrum manual The *CHR$* function can be used to select the correct character to match any value between 0 and 255, while the *Code* function translates any character into a value between 0 and 255

Using these two functions it is possible to store values between 0 and 255 in a single character In the case of our indicators, the single character that is added stores the length of the string plus one for the indicator itself, so that when the string is packed into the main file of data the indicator can be used to identify how much of what comes after the indicator is part of the same item If the indicator has a value of 11 then the item consists of the indicator and the following 10 characters

2) Lines 2810-2820 These lines print out item names such as name and address Note that the indicator value is here used to extract the useful part of a line in an array Item names are stored in A$ whose lines are 20 characters long The difference between the length of the item name and the length of the line in the array is made up of spaces which we do not wish to print

Line 2810 prints only that part of the relevant line in A$ which contains the characters of the item name Neither the indicator nor the spaces are printed This can be a powerful aid to formatting when text is stored in arrays which are longer than the text

3) Lines 2830-2840 FN A$ extracts a single item from the main file of data and will be explained further in the next module

4) Lines 2850 2900 This subroutine is used to print out entries from the file The variables used will be explained in the discussion of later modules

Testing Module 2

The correct performance of these subroutines can only be effectively tested when further modules have been entered

More of the Unifile program will be presented next week

This is an extract from *The Working Spectrum* by David Lawrence (price £5 95) published by Sunshine Books, Hobhouse Court, 19 Whitcomb Street London WC2 7HF

Almost to the minute

***Paul Stead** rings the changes with his clock program*

This program draws a clock face using the Dragon's *Circle* command. It also draws all the numbers using the *Draw* command and plots the sweep minute and hour hands. And it keeps time (well just about). The clock uses most of the good graphic commands on the Dragon 32 and uses the highest resolution.

Program Notes

Line(s)	
10-50	Asks for and sets time
60	Set up arrays for hands data
67-80	Sweep hand data
87-120	Minute hand data
127-150	Hour hand data
160-220	Loads data into arrays
229-370	Draws face, figures, paints border
390-490	Works out time, draws sweep, minute and hour hand, finds out if a minute has passed, makes sound, unplots sweep hand
990-830	Minute hand sub-routine
900-1040	Hour hand sub-routine

Variables

SX(S1) Sweep hand X plot
SX(S2) Sweep hand Y plot
MX(M1) Minute hand X plot
MX(M2) Minute hand Y plot
HX(H1) Hour hand X plot
HX(H2) Hour hand Y plot
S — Second
M — Minutes
H — Hour
T — 1/50 second

```
5 '**CLOCK COPYRIGHT SEPT 1982***Paul Stead [illegible]
8 CLS
15 PRINT PRINT
20 PRINT@43 "TIME PLEASE
41 PRINT@98 "HOURS (0 TO 11)"
42 PRINT@130,"MINS (0 TO 59)
43 PRINT@226 "SEC'S (0 TO 59)
44 PRINT@289 "SOME TIME HAS BEEN ALLOWED TO SET UP SCREEN
45 PRINT INPUT"TIME" H M S
20 IF [illegible]
30 [illegible]
40 H [illegible]
50 [illegible]
60 DIM [illegible]
62 '****************************
65 '******SWEEP DATA [illegible]
69 '****************************
70 DATA[illegible]
[illegible]
80 DATA[illegible]
[illegible]
87 '******MIN HAND DATA[illegible]
90 DATA[illegible]
[illegible]
100 DATA[illegible]
110 DATA[illegible]
120 DATA[illegible]
127 '****************************
128 '******HOUR HAND DATA[illegible]
130 DATA[illegible]
140 DATA[illegible]
150 DATA[illegible]
160 FOR A=0TO 5
170 READSX A
180 NEXTA
190 FOR B=0TO 5
200 READMX(B) NEXTB
210 FOR C=0TO 5
220 READHX(C) NEXTC
225 '****SET FACE[illegible]
230 PMODE4 [illegible] PCLS
235 [illegible]
240 DRAW [illegible]
[illegible]
250 DRAW [illegible]
260 DRAW [illegible]
270 DRAW [illegible]
280 DRAW [illegible]
290 DRAW [illegible]
300 DRAW [illegible]
310 DRAW [illegible]
320 DRAW [illegible]
330 DRAW [illegible]
340 DRAW [illegible]
350 DRAW [illegible]
360 CIRCLE(128,96),95
370 PAINT [illegible]
390 '*****TIME[illegible]
400 TIMER=0
420 [illegible]
425 SOUND[illegible]
430 [illegible]
435 [illegible]
440 LINE(128,96)-(SX(S1),SX(S2)),PRESET
450 LINE(128,96)-(SX(S1),SX(S2)),PSET
460 LINE(128,96)-(MX(M1),MX(M2)),PSET
470 LINE(128,96)-(HX(H1),HX(H2)),PSET
480 [illegible]
490 [illegible]
590 '****************************
595 '******MIN HAND [illegible]
599 '****************************
800 LINE(128,96)-(MX(M1),MX(M2)),PRESET
805 [illegible]
810 [illegible]
815 [illegible]
820 [illegible]
830 RETURN
990 '****************************
995 '******MOVE HOUR HAND******
999 '****************************
1000 LINE(128,96)-(HX(H1),HX(H2)),PRESET
1020 [illegible]
1030 [illegible]
1040 RETURN
```

Mission possible

***Brian Cadge** presents a program to mix text and hi-res graphics*

Although the Dragon is not supposed to be able to mix text and hi-res graphics this is in fact possible. All of the displayable ascii characters can be put on the graphics screen which has a resolution of 64 × 192. All eight colours may also be present at one time (instead of the usual four using *Pmode*).

Locations FFC0 to FFC5 are the display mode registers called V0, V1 and V2. To set a register an odd address is written to (*Poked*) and to clear a register an even address is written to. The registers have the following addresses:

V0 clear — FFC0 set — FFC1
V1 clear — FFC2 set — FFC3
V2 clear — FFC4 set — FFC5

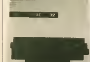
Turn to page 28

continued from page 25

It is the combination of these registers which determines the display mode that you are in eg all three registers cleared — normal alphanumerics

For our special resolution of 64 × 192 with text the registers must be set as follows V0 — clear V1 — set, V2 — set This requires 6144 bytes and includes the normal text screen memory Therefore, our screen s top-left position is at location 1024 and the last point is at location 7167

The important part is how to write to this screen The normal ascii characters 128-255 are the coloured graphics blocks Take the code of the character whose top line is the combination you want and *Poke* that code into the location on the screen To put a text character on the screen, take the ascii code of it and *Poke* this into 12 column consecutive addresses ie add 32 each time



The following program demonstrates the way in which the screen works Line 10 sets up the registers to display the screen Lines 20 to 40 fill the screen with multicoloured strips each one pixel thick Lines 50 onwards display the message "*POPULAR COMPUTING WEEKLY*" As can be seen from line 60 the only ascii code that must be changed is the space character (code 32) — this becomes code 96

```
Line(s)
 10 POKE &HFFC0,255 POKE &HFFC3,255 POKE
    &HFFC5 255
 20 FOR I = 1024 TO 7167 STEP 32:FOR J = 0 TO
    31
 30 POKE I+J 1A$+L
 35 NEXT J L=L+16 IF L>130 THEN L=0
 40 NEXT I
 50 A$= "POPULAR COMPUTING WEEKLY"
 60 FOR I=1 TO LEN(A$)
 70 A=ASC(MID$(A$ I 1))
 80 IF A=32 THEN A=96
 90 FOR J=0 TO 320 STEP 32
100 POKE 4100+J+I,A NEXT J I
110 GOTO 110
```

The best way of working out how to use this resolution is by experiment rather than demonstration

Here are a couple of other interesting points Locations FF00 and FF02 are the keyboard row and column locations Also bit 3 of location FF21 is the cassette motor control — 0 is off 1 is on ■

Jumping to the flag signs

Last week we explained how to modify the loader program to accept hex by combining it with our decimal/hex converter We also looked at a subset of opcodes for the Z80 with particular reference to And, Or Xor *and* Cp

The flags which most interest us are the Carry, Zero Overflow and Sign flags *Cp* can alter any of these but the one of most significance here is the Zero flag which is set if the two values being compared are equal

If the *A* register contents are *less* than those of the compared byte the sign flag is set This is equivalent to saying "the result is negative This is all you need to know about the flags at the moment — it is an intricate topic if you delve deeper

The Jumps

All the conditional jumps branch (or not) depending on the contents of the flags So, for instance, *Jpz* says "jump if the Zero flag is set" Now you can see how the *Cp* instruction can be used Suppose for example, that you wish to see if a particular byte pointed at by *Hl* contains 1E hex If it does, we want to branch to 447B The code is

```
LD A 1E     3E 1E
CP A, (HL)  BE
JPZ 447B    CA 7B 44
```

All the other jumps behave similarly *Jpnz* says "jump on a non-zero result (zero flag *not* set), *Jpp* says "jump on a positive result (sign flag *not* set), *Jpm* says jump on a minus result (sign flag set) *Jpnc* says jump on no carry (carry flag *not* set) and so on

All of them have one thing in common and that is that the address of the jump is fixed If for any reason you want a routine to run somewhere in memory other than where you first loaded it all the jump addresses must be changed The Z80 deals with this neatly by allowing ' relative jumps (*Jr*) In other words you can jump so many bytes forward (or back) from where you are This displacement is held in 1 byte so the distance which can be jumped cannot exceed 128 bytes backwards or 127 bytes forwards

The displacement is calculated from what the *Pc* value *would* have gone to next had no jump occurred — namely the address of the next command in the program

Here is an example We want to examine each byte of memory in turn for the first occurrence of 1E hex Assume for simplicity that the start address is already in *Hl* We could write

```
        LD A 1E
LOOP    CP A, (HL)
        INC HL
        JRNZ LOOP
```

Two points need explaining First, we have sneaked in a new instruction — *Inc* This is short for increment It just adds 1 to the contents of the specified register, so the compare operation is always looking at the next memory byte because *Hl* is being bumped up by 1 every loop (*Dec*, short for decrement does exactly the opposite) The second point is that there s no obvious difference between *Jrnz Loop* and *Jpnz Loop* It isn t until we *assemble* the instructions into machine code that the difference is clear ■

JR command → 18
displacement code → ?
where PC would have gone →

	−128	80
	−3	FD
18	−2	FE
?	−1	FF
	0	00
	1	01
	2	02
	3	03
	127	7F

size of displacement to be coded as ?

2's complement hex code

If you have any machine code subroutines/tips/games, please send them to Machine Code, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF

Reproduced from *Machine Code and better Basic*, by Ian Stewart and Robin Jones (price £7 50), by kind permission of Shiva Publishing Ltd 4 Church Lane, Nantwich Cheshire CW5 5RQ

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke, PCW*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.

AVOIDING THE BIG BANG

R Hargreaves of Birline Drive Luton writes

Q I own a 16K ZX81, and a ZX Spectrum. As part of a school technology project, I am building a pair of joysticks. The main problem that I have come up against is how to connect the joysticks to either the ZX81 or the Spectrum.

There are two ways that I can see of doing this. Either by connecting a lead to the ribbon cable under the keyboard, or by connecting a lead to the expansion port at the back of the computer. I would prefer to use the latter method. Can you help, or do you know of any literature that would be useful?

A You do not say whether you are constructing a potentiometer or a switch joystick. I would guess that you are building a switch type as these are far more common and you would need an A/D converter for a potentiometer. I will explain how to connect switch joysticks to the ZX81.

Although it might seem more inconvenient at first, it is safer and easier to connect the joysticks up to the underside of the keyboard ribbons rather than to the I/O port.

There are two connectors on the ZX81 pcb for the ribbon cable from the keyboard: the five-way Data lines and the eight way Address lines. Each of the four switches will need to be wired to a separate data line. This can be done in any order, but I would suggest switch 1 to D0, switch 2 to D1 and so on, leaving D4 unattached (this could be used for a fire button).

You will then need a single address line from any of the addresses wired to each of the switches. Again I would advise that you used A11 or A12 as this would mean that the numbers 1 to 5 or 6 to 0 were being used.

You can of course use any group of five keys depending on the address line that you choose. When using the joystick in a program use the *Inkey$* function to read the input in the normal way. If you wanted to keep the directions exactly as on the keys, then the address line A11 would have to go to the switch controlling the movement left and address line A12 would have to go to the rest. But unless you have a special reason for doing this it would be a lot more straightforward to use a single address line, as it reduces the chance of a potentially dangerous short circuit.

MIX-UP OVER BINATONE

Chris Beaumont of Walton Park, Walton on Thames writes

Q I have heard that the new Binatone computer which is coming out next year will use Tandy TRS-80 software. Could you tell me if this is true? If so, will it use level I, II, or III software?

A The Binatone computer seems to have been the cause of much confusion as to when it is, or is not, going to be released, or even if it really exists. It seems now that reports that it will be compatible with the TRS-80 at any level are wrong. All that we know is that it will have standard microsoft colour Basic. The launch has been postponed and so we do not expect to see it until next spring at the earliest.

MICROS IN EDUCATION AND SCIENCE

C Hammond of Wimborne Dorset writes

Q As a recent convert to computing and as a chemistry teacher, I can see great value for the use of a computer in the laboratory and as an aid to learning.

I would appreciate it if you could publish the names of software houses who specialise in education and science. Are there any User Groups who would be able to help me and other teachers. I have a Spectrum based in my laboratory. Our computer studies department has a BBC model A and B, a 380Z and a ZX81.

A The group you need to contact is EZUG, the Educational ZX Users Group. They offer an increasing amount of support by way of a newsletter. They were formed out of MUSE, Micro Users in Secondary Education, and between them they have built up a library of software for all the micros commonly found in schools. Another group you might want to contact is MAPE, Micros and Primary Education.

Most of the software produced by these groups is written by teachers for teachers, and is usually available to members. In the same way, a growing number of software houses are producing educational software. Scisoft and Calpac both deal with ZX material, while AVC write their programs for both the Sinclair and the BBC machines.

MUSE is based at 48 Chadcote Way, Catshill, Bromsgrove, Birmingham B61 0JT and EZUG (Eric Deeson) at Highgate School, Birmingham B12. MAPE's (Barry Holmes) address is St Helen's Primary School, Bluntisham, Cambridgeshire PE17 3NY.

GOOD SOLUTIONS COST MONEY

D Clew of Beckenham, Kent writes

Q I spoke to someone on your stand at the recent Barbican show, who advised me to write to you. I have a problem with my BBC model B. Like the Spectrum on your stand, it suffers from barring and oscillating, with flickering characters and graphics. The degree of the problem depends on how hot my micro is, but the problem is always there.

Acorn said that this happens on all BBC computers, and most others that project a display via a television aerial socket. I was told that the problem lay in synchronising the micro's colour signal cycle with the television's and keeping it there. I know that the problem does not occur on RGB monitors, nor on composite video B/W.

The person I spoke to on your stand said that something could be done by a qualified television engineer. A device could be placed in the line between the input and the aerial.

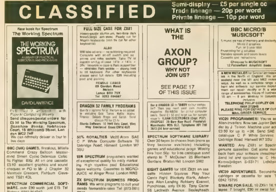
Unfortunately, two other magazines I have written to could not offer much help. One said: 'Try a new aerial lead, and if that fails get a monitor' and the other 'Don't worry, Tim Hartnell's Atari is nearly as bad as the Spectrum in this respect'.

If the problem really is this common, you would have thought that there would be a solution. Is there?

A Yes, there is a solution, but it costs money. The problem tends to be ignored because it is so common. In most cases the screen display is adequate enough for it not to be a major worry. I can only assume from what you say that you have a worse than average computer in this respect.

You must remember that a television has to de-code a broadcast signal, and the airwaves are full of extraneous and unwanted material. Thus the signal from your aerial goes through what can best be described as a series of filters and de-coders. These in effect 'play safe' by cutting off the top and the bottom of the signal, thus removing most of the possible interference. But when your computer is plugged in, it also cuts out some of the signal. Just how much is left is called the bandwidth. If your computer is slightly out of synchronisation, then more of the signal will be cut. If your computer is hot, this will have a small effect on the phasing of the signal.

Televisions can be bought that have a direct video input in addition to the normal aerial input. Unfortunately for you these are invariably for colour — the BBC video signal monitor is in black and white. To use your television you would need to wire an RGB interface to by-pass the normal signal receiving circuitry and take the signal from the RGB output on the computer straight to the tube. I have no idea how much this would cost, but it would need to be done by a skilled electrician.



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December 11-12 (Sat-Sun)
Christmas Microfest 82 University of Manchester Institute of Science and Technology Sackville St Manchester Entry £1 and 50p Open from 10 30 am

December 18 (Sat)
Fifth ZX Microfair New Horticultural Hall Greycoat Street London SW1 Open 10 am—6 pm Contact Mike Johnston (01-801 9172)

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January 10-15 (Mon-Sat)
Apple Tuition Courses University of Salford Two and three day courses Apple for Beginners and Getting More From Your Apple Contact Mrs S R Hill Microprocessor Short Courses Unit University of Salford (061 736 5843 ext 248)

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April 28-30 (Thurs-Sat)
Midland Computer Fair Bingley Hall Birmingham Contact IPC Exhibitions (01-643 8040)

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The Sixth Personal Computer World Show Barbican Centre London

Clubs

Walsall ZX And Sinclair Users Club meets on the first and third Thursdays of the month at 7 15 Contact Conrad Roe 25 Cherry Tree Avenue Walsall enclosing SAE or phone Walsall 25465 after 6 pm

Chelmsford ICPUG Branch Local Commodore users contact Tony Surridge 87 Shelley Road Chelmsford Essex enclosing SAE or phone Chelmsford 31978 after 6 pm

Preston Atari Computer Enthusiasts Mainly Atari but Apple Tandy Vic and Sharp users also welcome Meets on third Thursday of each month membership £6 and £2 50 Contact R Taylor 177 Forest Drive Lytham St Annes Lancs or phone 0253 738138

Furness Computer Club meets fortnightly on Wednesdays in the Brown Cow Dalton Furness at 7 30 pm Contact R Wade, 67 Sands Road Ulverston Cumbria enclosing SAE or phone Ulverston 55068

Nottingham Microcomputer Club meets on the first Tuesday of most months at 7 30 pm in the Friends Meeting House Clarendon Street Nottingham Contact E Harvey 38 Roe leigh Avenue Mapperley Nottingham enclosing SAE or phone 0602 608491 (evenings)

Lancaster and Morecambe Microcomputer Club meets on alternate Tuesdays Contact David Smith on Lancaster 33279

Wolverhampton/Telford Vic Users Group is being formed Contact J Bowman 6 The Oval Albrighton Wolverhampton West Midlands enclosing SAE

Grimsby Computer Club meets on alternate Mondays at 7 30 pm in the Centre Library George Street Grimsby Family night on 24 November Contact Jensen Lee 29 Park View Cleethorpes (Tel 0472 42559 day time)

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Ancient Algorithms

Puzzle No. 32

by Tony Roberts

OUR CAVE-FAMILY HAS AN OVER-CROWDING PROBLEM

AND SO THEY SET TO, EXCAVATING TWO NEW CAVES BEHIND THE ORIGINAL ONE

FAMILY 1
FAMILY 2
FAMILY 3

SOON, THE POPULATION DOUBLES, THEN TREBLES IN THE NEW CAVES....

AND SO THE FAMILIES IN THE NEW CAVES WORK TO EXCAVATE TWO NEW CAVES FURTHER INTO THE CLIFF, EACH THE SAME SIZE AS THEIR EXISTING CAVE

F1
F2
F3
F4
F5
F6
F7

THE OVERCROWDING CURED, THE PEOPLE IN ADJACENT NEW CAVES SOON FORM A SINGLE COMMUNITY OF THEIR COMBINED FAMILIES....

F1
F2
F3
F4
F5&6
F7

AND SO, WITH EACH NEW GENERATION, THE CAVE SYSTEM GROWS BACK INTO THE CLIFF — ALWAYS IN THE SAME WAY — UNTIL AFTER FOUR GENERATIONS....

THERE ARE 11 FAMILIES

Q WHAT ARE THE CAVE PEOPLE FORMING?
(AND WHAT HAS IT TO DO WITH PROBABILITY?)

Solution to Puzzle No 28

This algorithm is calculating the sum of series 1 + 2 + 3 + 4 ... + n where n is the number of stones in the heap. In mathematical notation Σ, the Greek letter capital sigma, is used to indicate such a summation. In this case it would be written as $\sum_{1}^{n} x$ where x is the sum of the series from 1 to n. The 1 and n are called the limits of the sum and are written at the top and bottom of the sigma.

The algorithm shown makes use of the expression $\sum_{1}^{n} x = \frac{1}{2}(n+1)n = \frac{n^2+n}{2}$

A Basic program to do the same is

```
10 INPUT H
20 P = H
30 P = INT(P/2)
40 M = H − (2*P)
50 H = H + (H*P)
60 IF M = 0 THEN H = H − P
70 PRINT H
```

Winner of Puzzle No 26

The winner is A Moore, High Street, Bala, Gwynedd who receives £10

ZIGGURAT

The numbers game

In their desire to paint a rosy picture of what is in store for us many futurologists seem to ignore the great difference between 'will' and 'might'. Prophesying the future is fun and it can be an amusing game as long as we remember not to take ourselves too seriously. Neil Ardley's book *Health and Medicine* (in the World of Tomorrow Series 1982 £3.99 37pp) is an example of a book which takes itself far too seriously in an area which is the subject of great debate.

What are we to make of this book which says (without any qualifications) that in tomorrow's world artificial limbs *will* work 'as well as real ones or perhaps even better'? Not a might but a will. Some *might* say that it does no harm to give this to young unsophisticated children — after all they are only children but we have to consider not only the expense but more importantly the style of thought attitudes represented by such a book. As medicine develops so does society in health care it is now realised that to care for a patient does not need to mean a recourse to high technology — rather many patients are best treated within the community.

In books like *Health and Medicine* the human side seems to be forgotten. Respect for the individual is lost and a desire to make humans as alike as possible appears — deviations from the normal will be removed. (Though who can say what is normal?)

In Ardley's world of the future the computer is everywhere and one of the functions of the computers will be to give you advice. There is still a place for the doctor though. We are told that a doctor will be present to discuss the results of the computer's diagnosis if the patient wishes. But if the computer is so competent at diagnosis one would think it should be able to discuss its own behaviour.

The section 'Hospital of the future' concerns an operation to replace a severed arm by microsurgery. The operation is predicted to be very intricate because tiny nerve endings and blood vessels have to be fixed to each other. 'The robots work tirelessly and with great precision and speed to repair the damage.' Not wishing to appear too anti human the author informs us that human surgeons check the robots via television and make sure that the patient remains in good condition. Why are the surgeons not there? And why must they use television?

The section 'Bionic people' informs us that for artificial limbs computers *will* be linked to the nerves that normally carry impulses from our brains to our muscles — a person will only have to think of a movement and the artificial limb will perform it. It is at this point that Ardley states that artificial limbs *will* be better than the real thing. Bernard Wolfe (in 1952) wrote a book *Limbo 90* in which he took ideas from the new science of cybernetics to produce a future where young men underwent voluntary amputation of limbs to be replaced by artificial limbs — because artificial limbs were superior. *Limbo 90* was considered in its day to have brought a new dimension of terror to science fiction.

Ardley's book shows us how an unreflective enthusiasm for information technology can lead us to a technological utopia devoid of humanity.